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BDM's Independent Manual Series

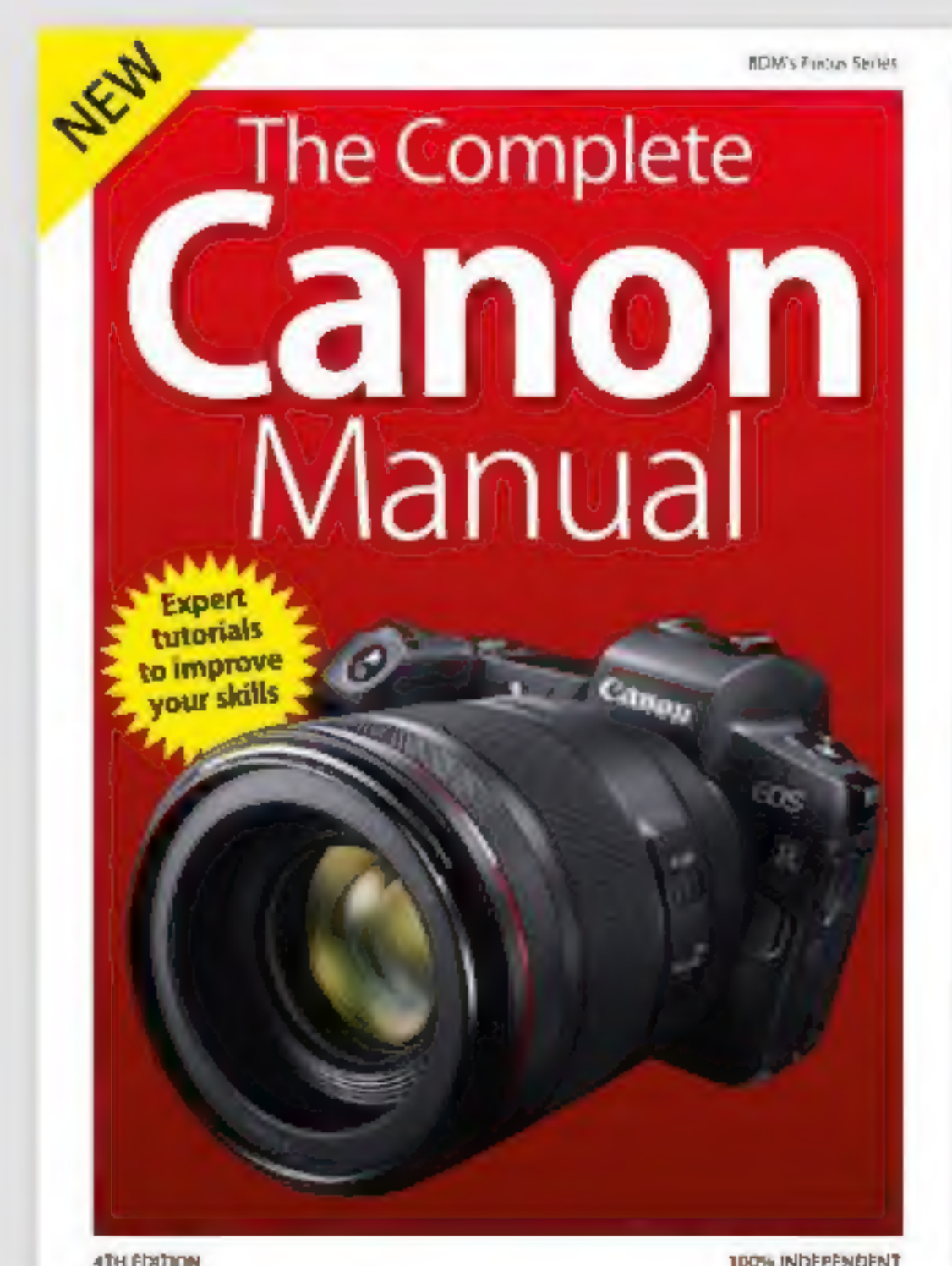
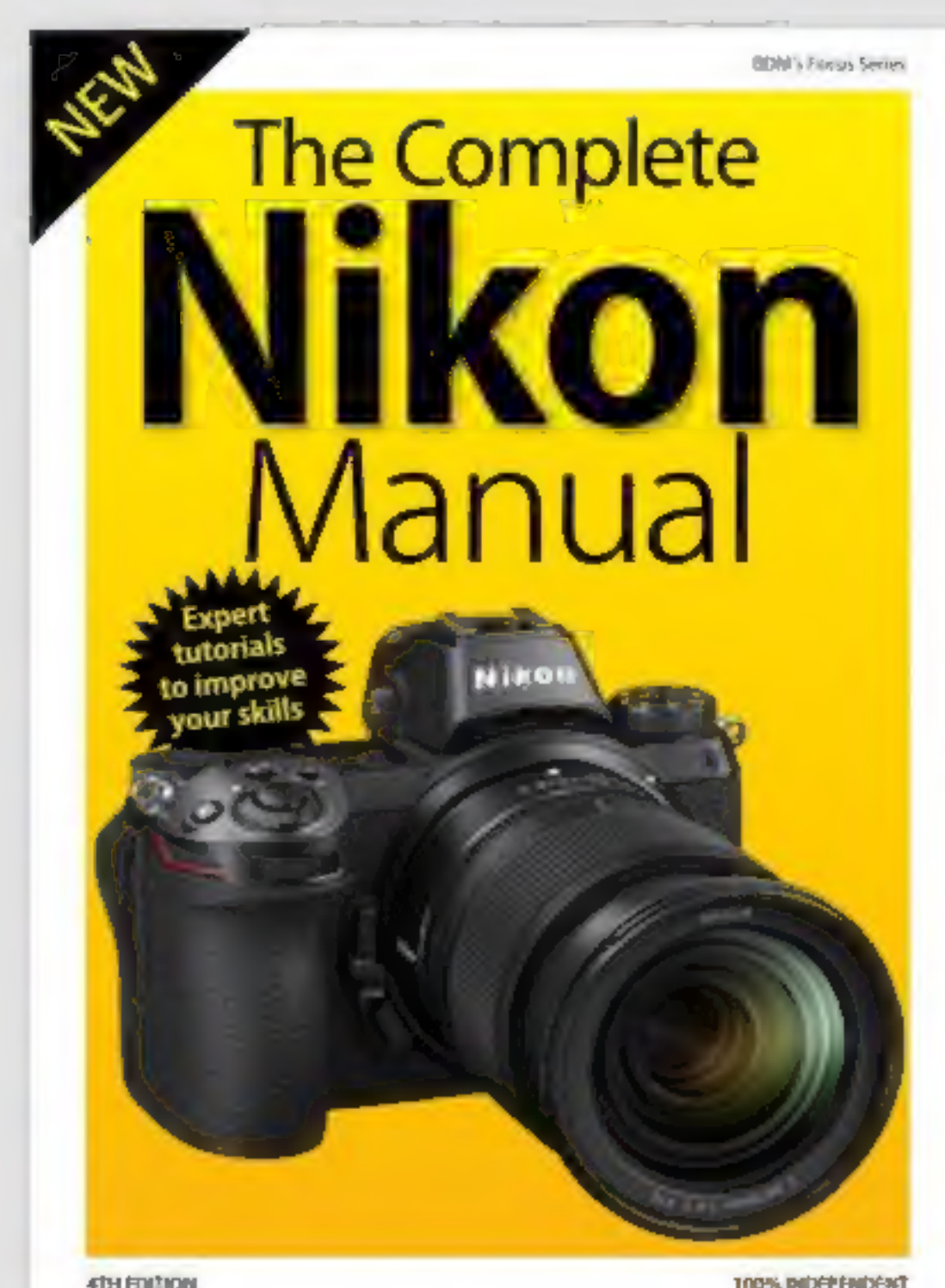
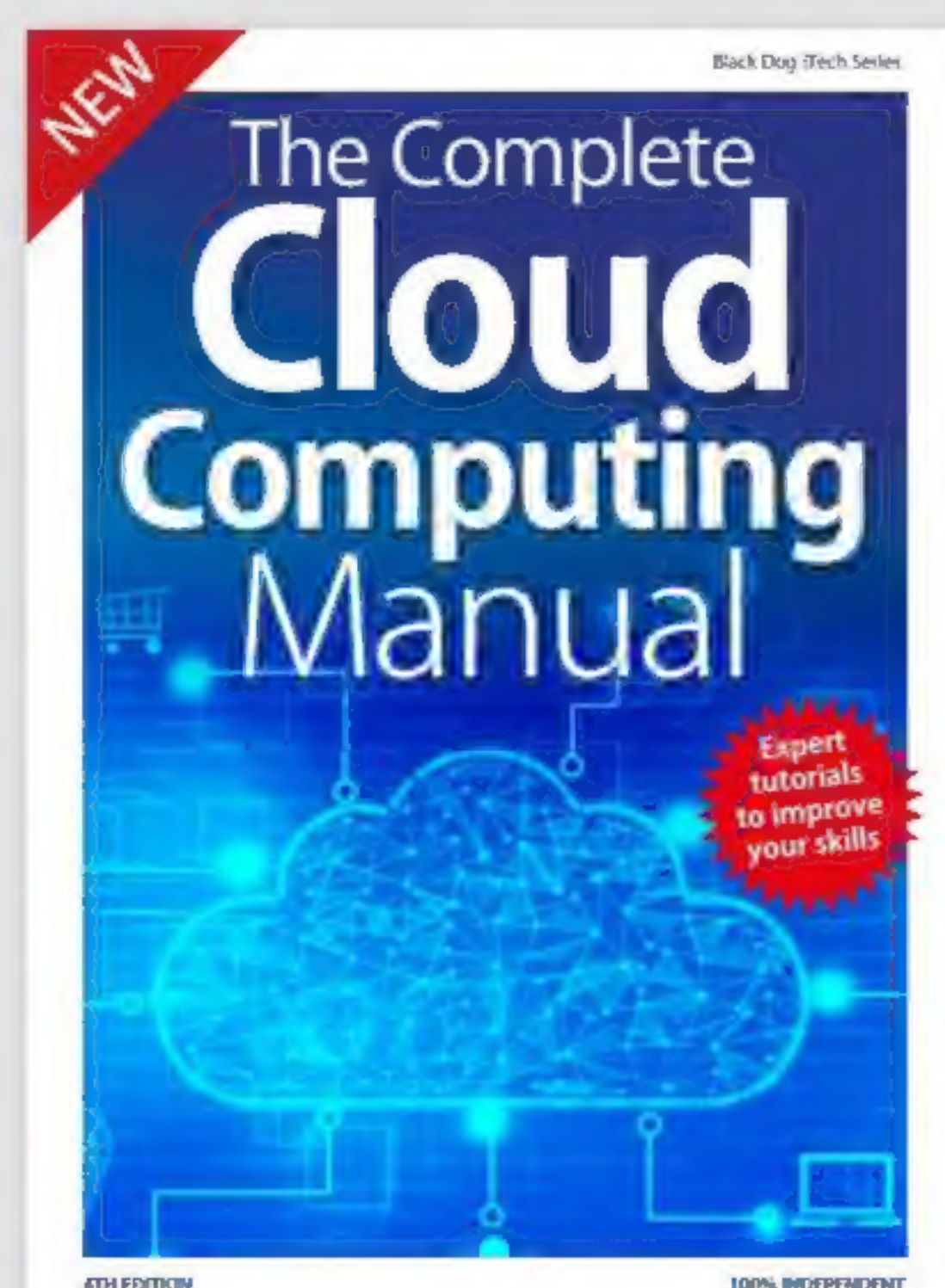
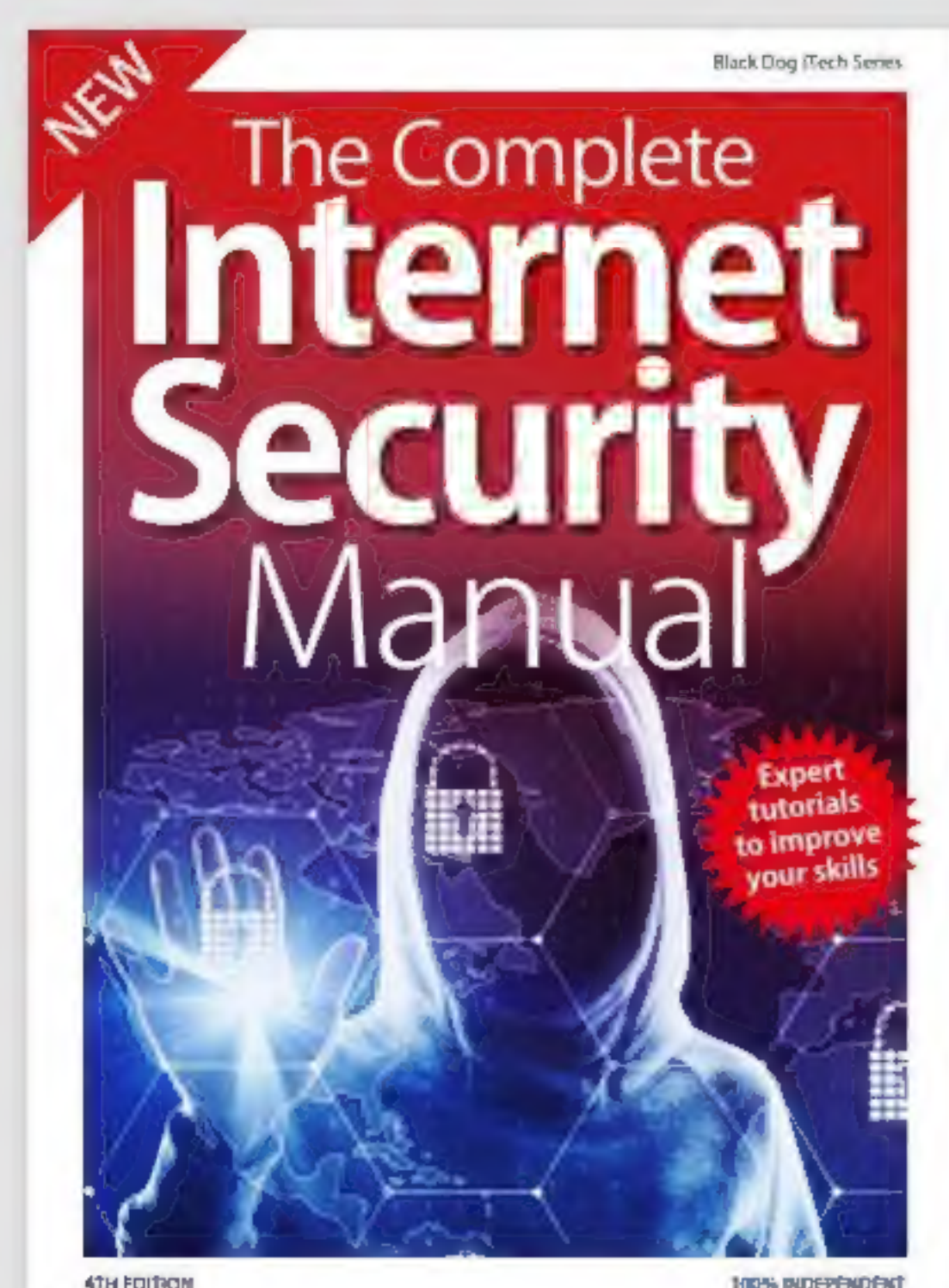
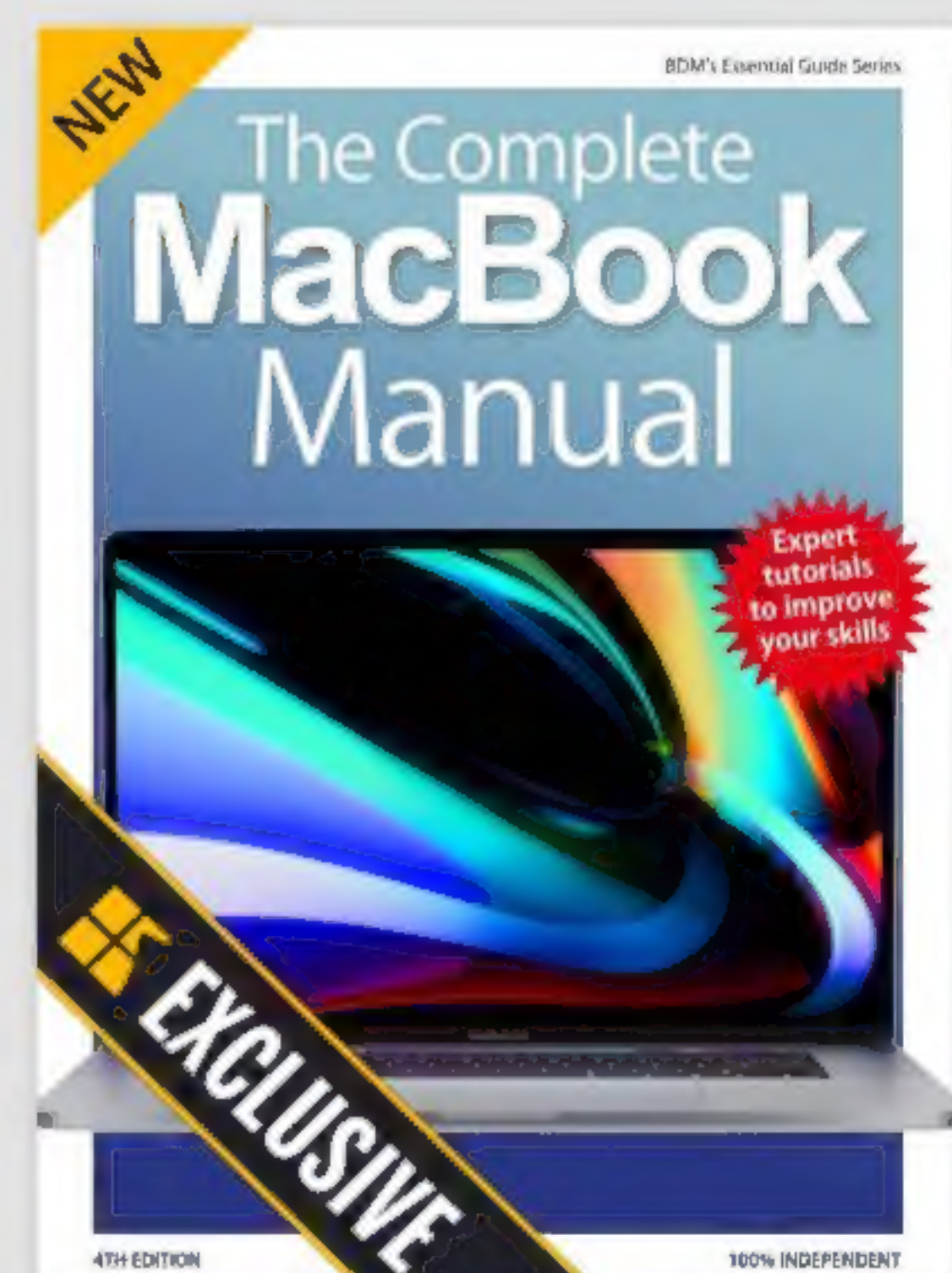
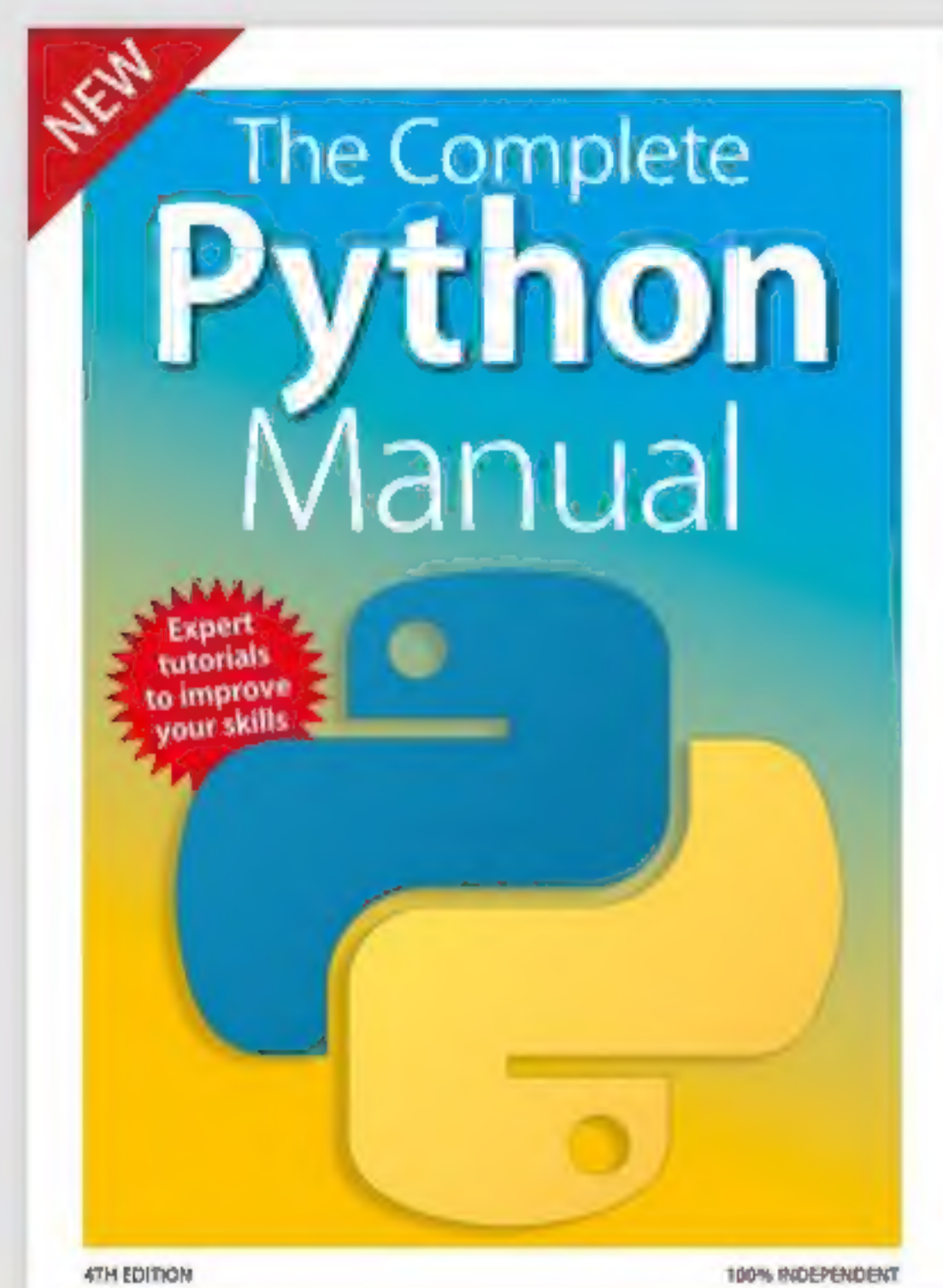
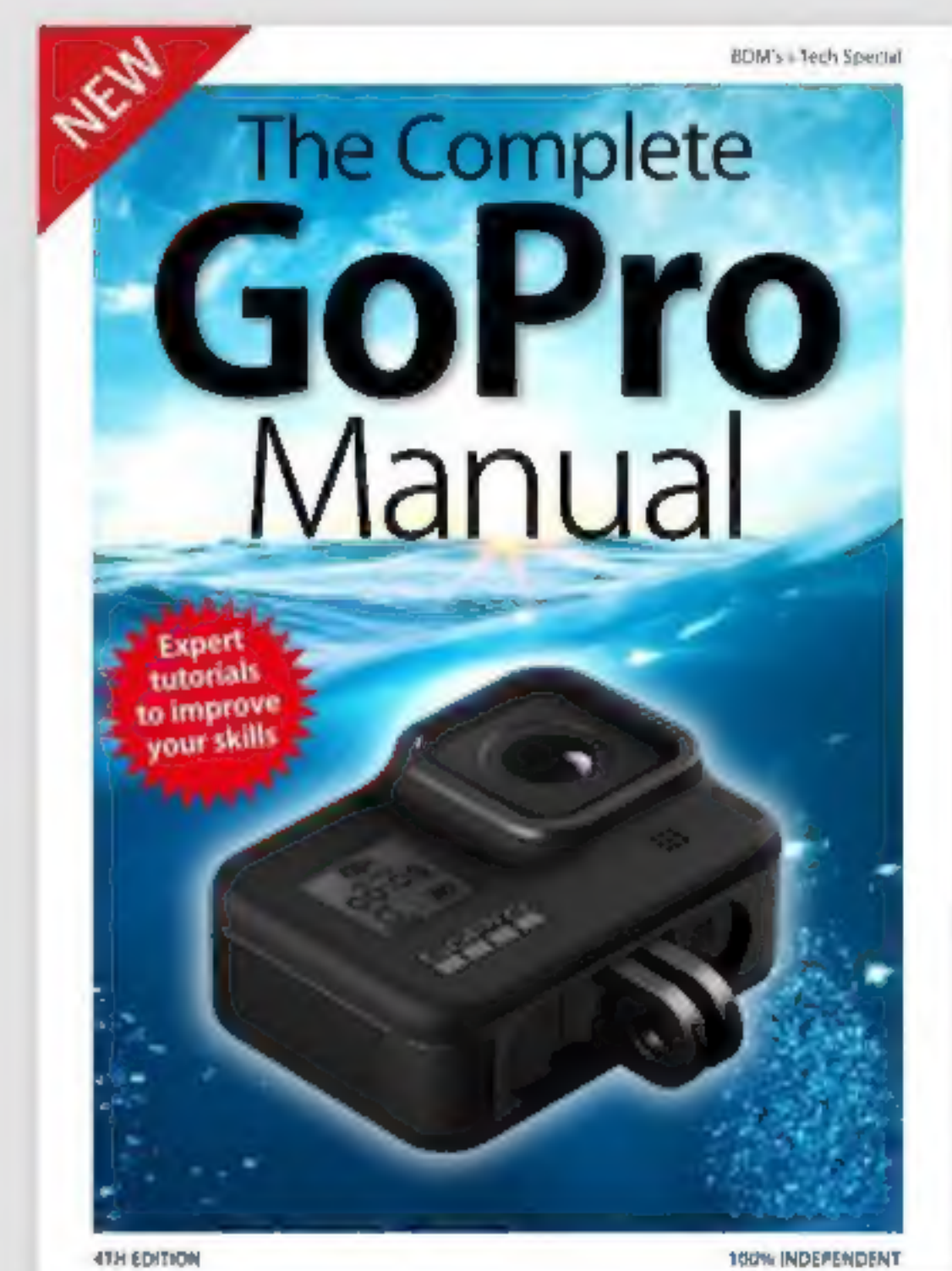
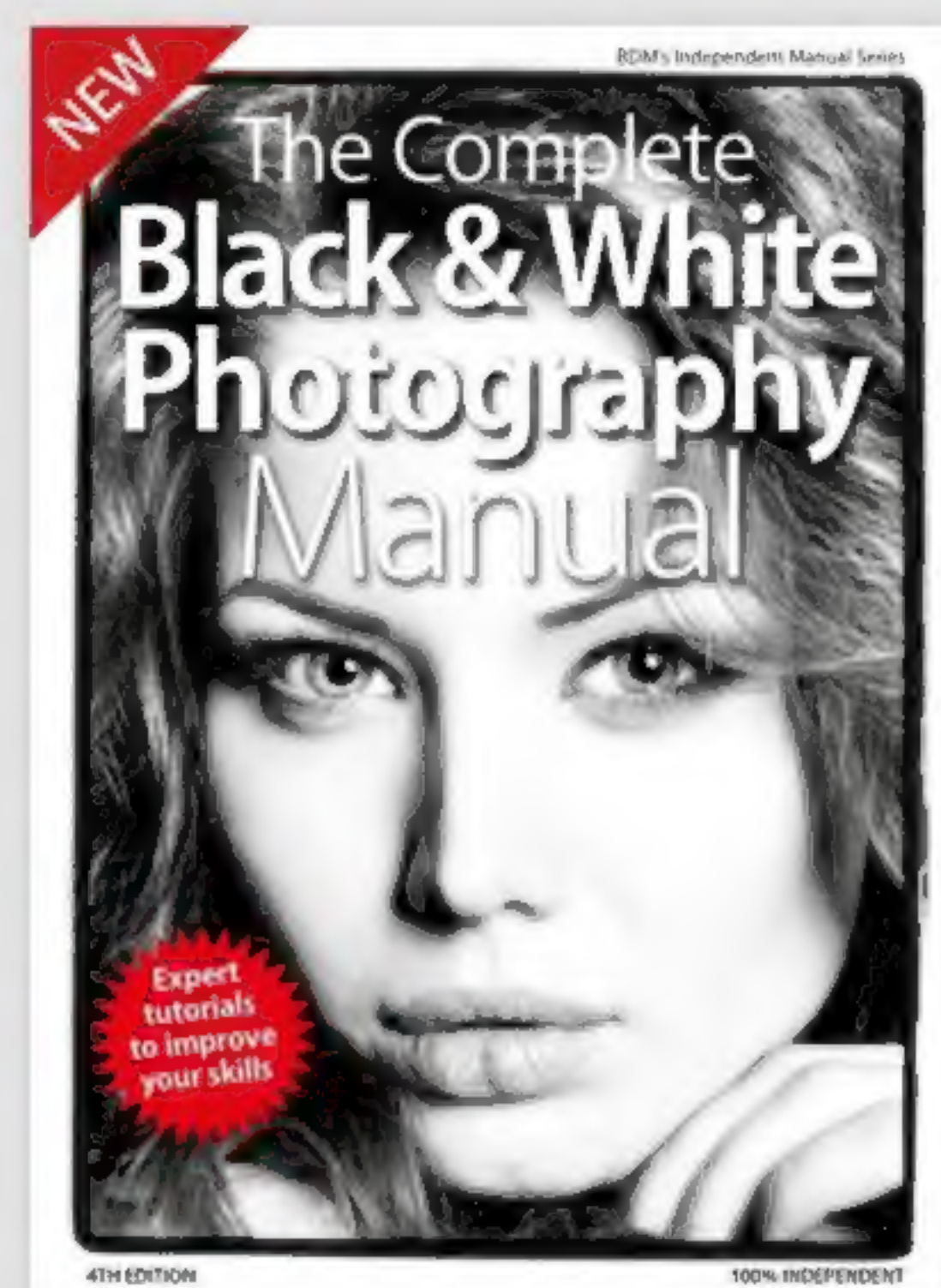
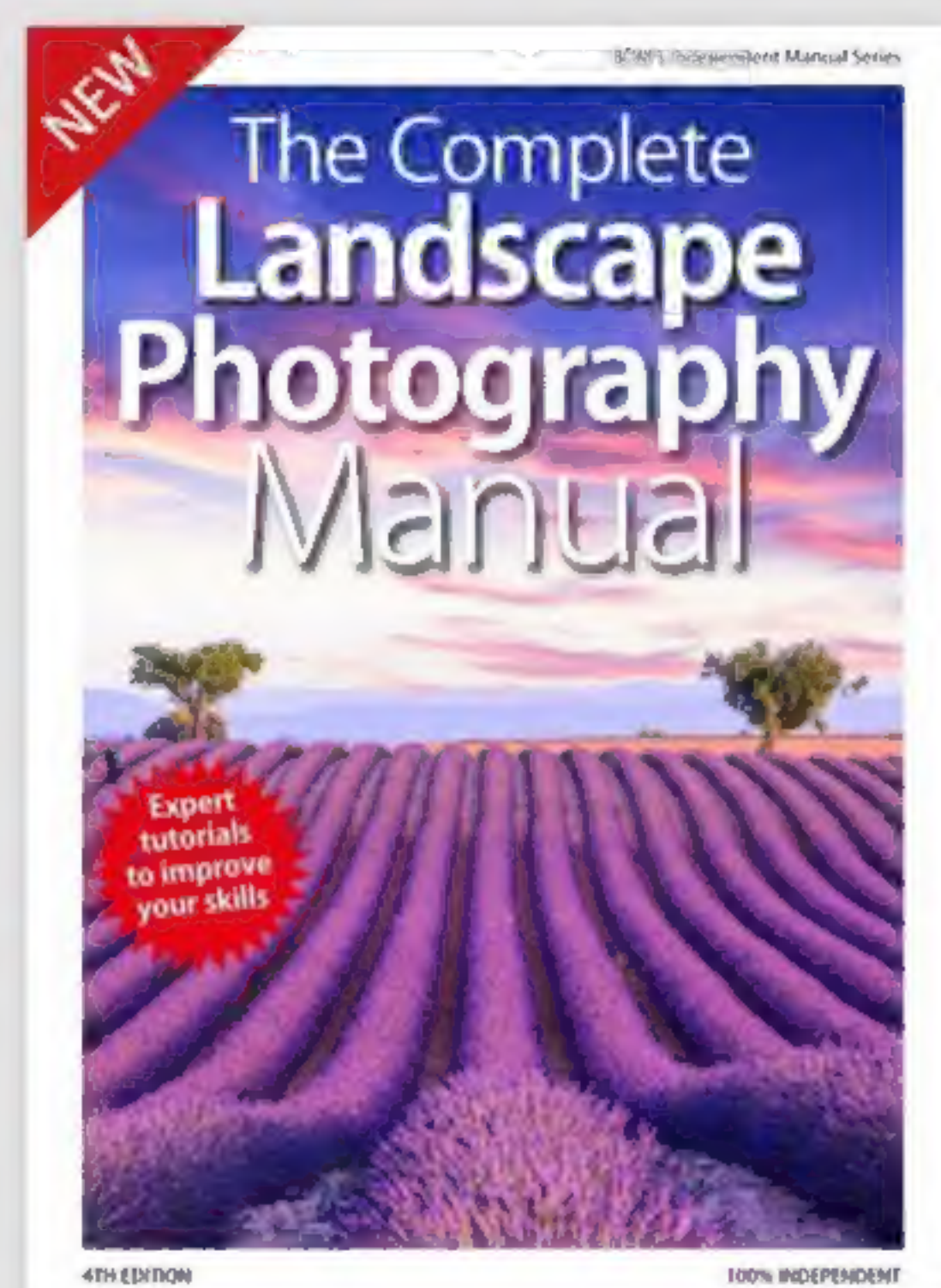
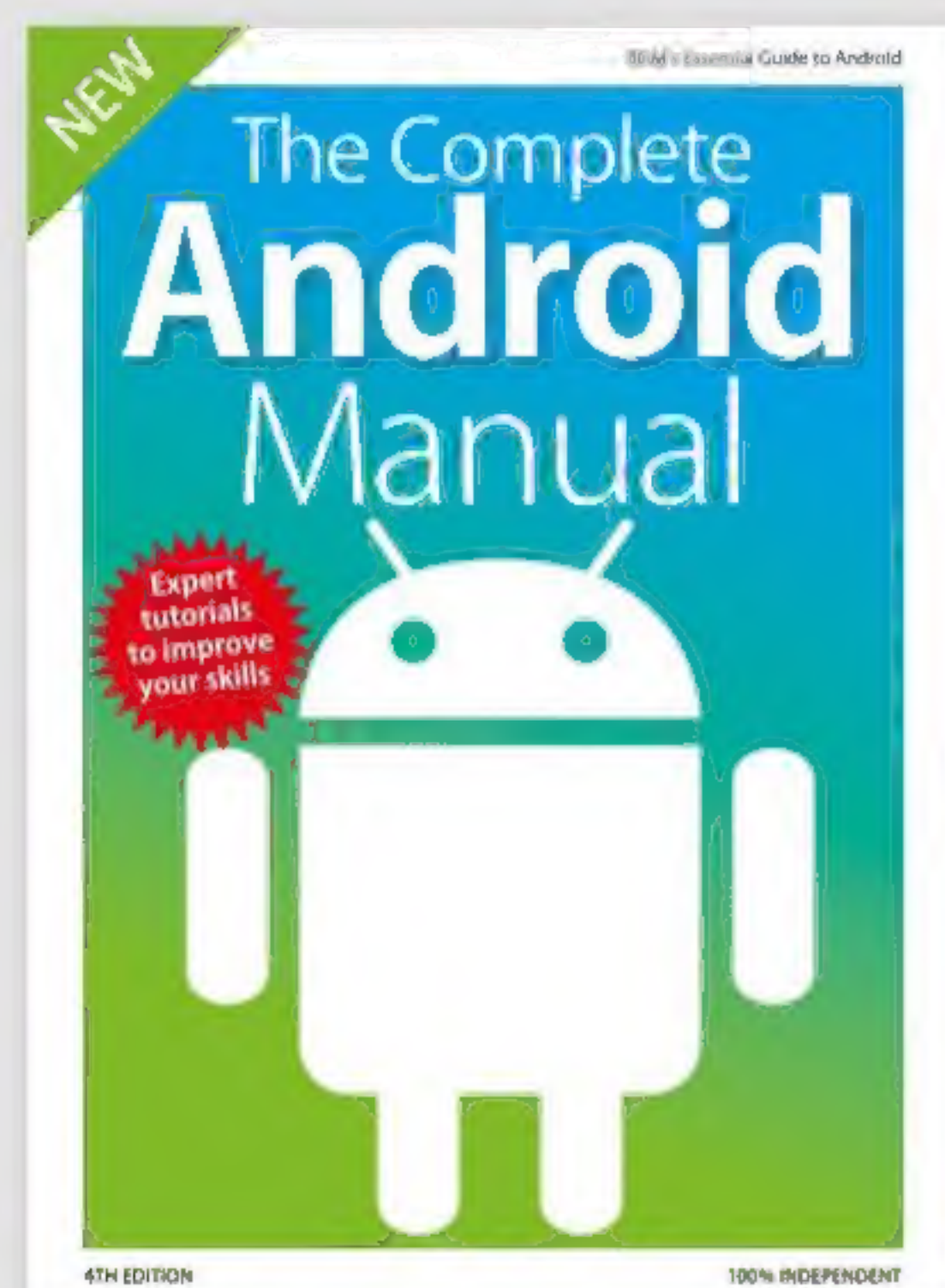
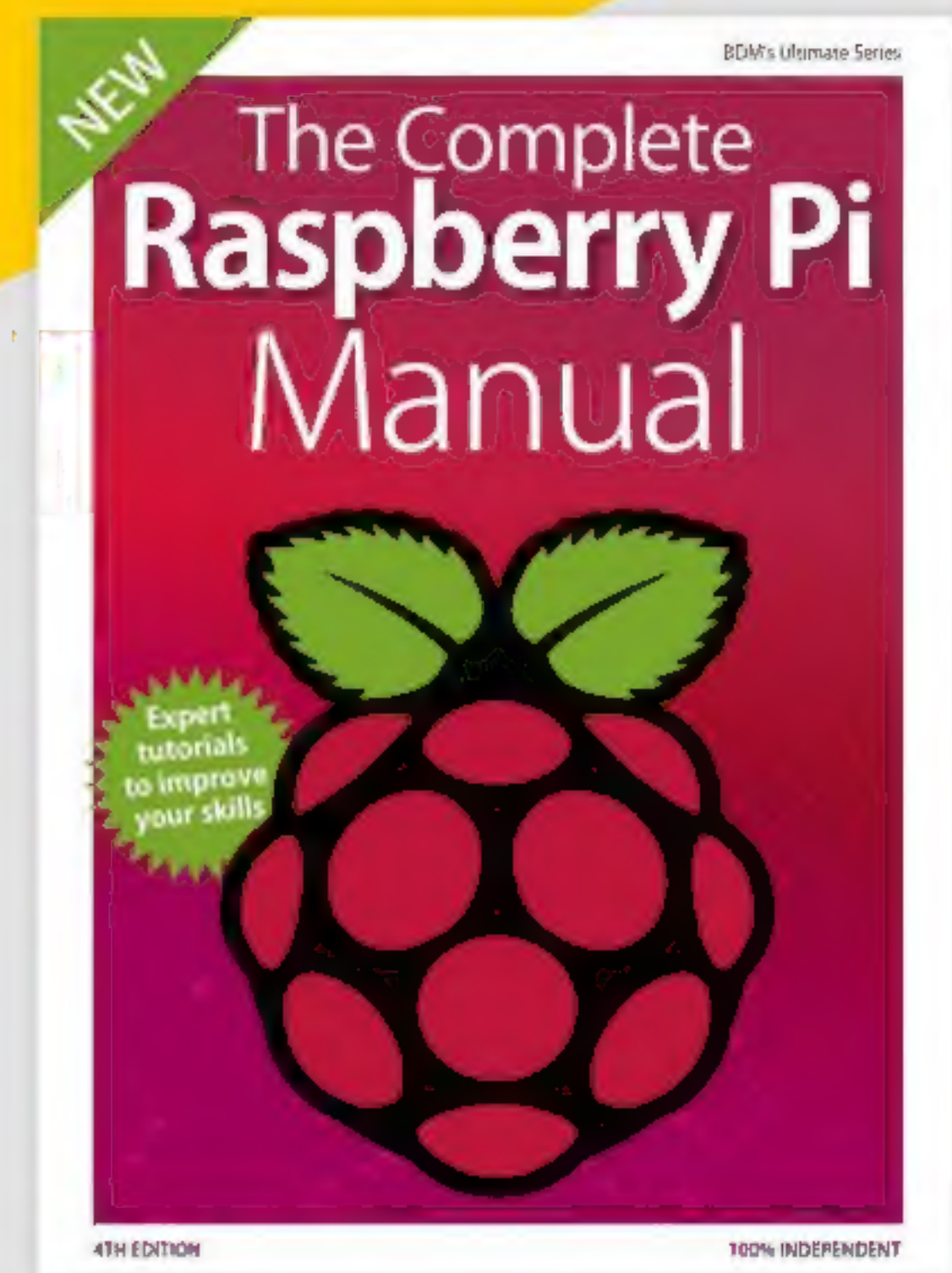
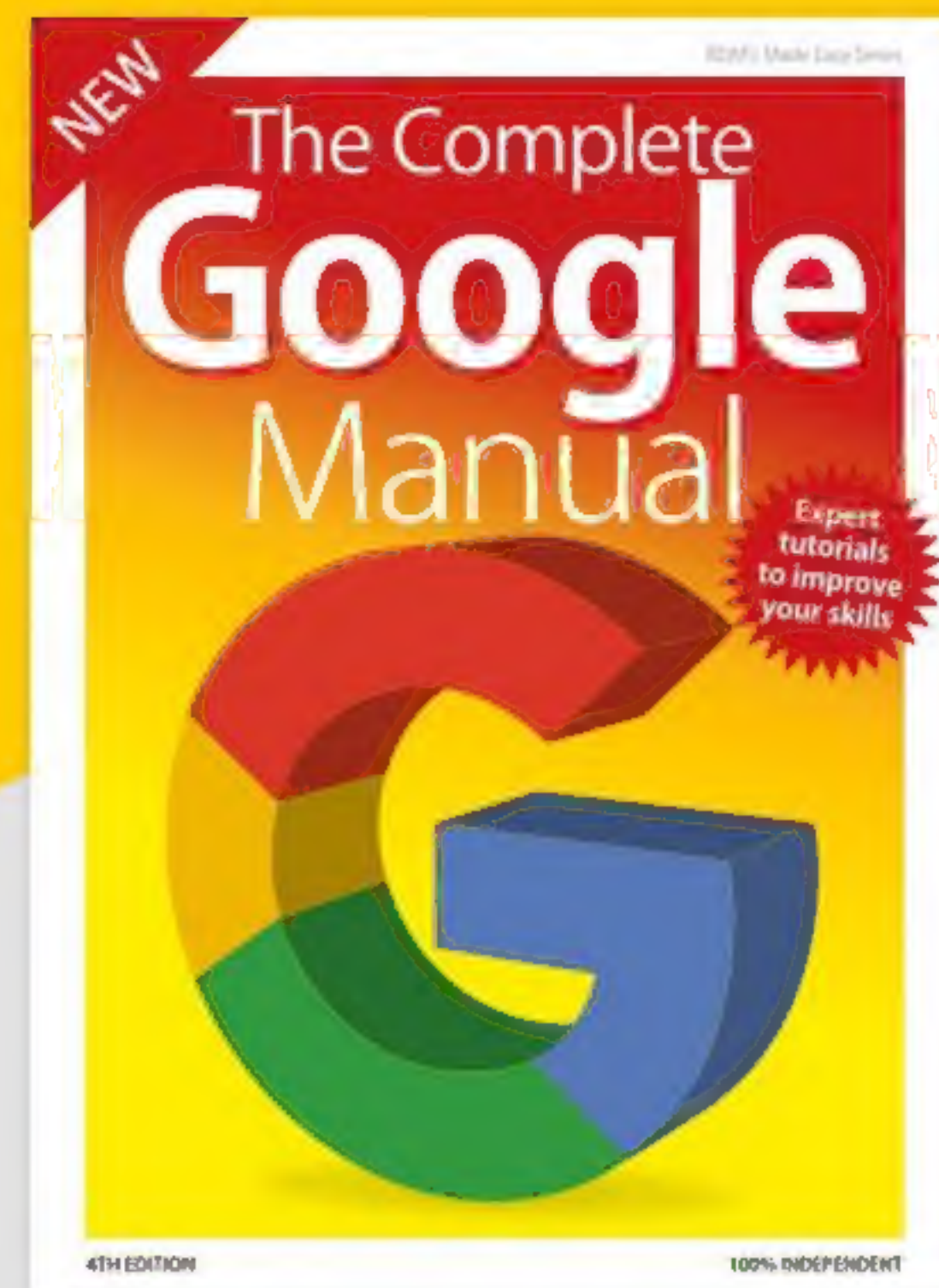
The Complete **Photography** Manual

**Expert
tutorials
to improve
your skills**

4TH EDITION

100% INDEPENDENT

Discover more of our Complete Manuals today...



WELCOME

Cameras are everywhere: on our phones, on our computers, even in items of jewellery and clothing; but despite this many people are still mystified by them. With new technology, sophisticated new features, and even entirely new types of camera appearing every few months, the ever-changing world of digital photography can seem pretty daunting, especially to the beginner. If you're interested in photography as a more serious hobby or just someone who takes pictures of friends and family and the occasional holiday snap, this guide can help. We will outline the main camera types and then take you through some of the essential basic camera craft that is the foundation of any good photography.

This includes details about shutter speed and camera shake, focusing, metering and aperture and depth of field.

Then we will take you on to some more varied photographic projects that cover a broad range of creative and technical disciplines. Discover how to get more out your landscape images and develop your skills as a portrait photographer. We even cover HDR, Infrared and black and white photography so you will have plenty of creative ideas to try out. Photography should not be viewed as some dark art only performed by photographic wizards. Photography is a very accessible and fun skill to develop. We hope that this collection of both technical and creative information will help you take your photography to levels you never thought possible before. ■

“Photography should not be viewed as some dark art only performed by photographic wizards. Photography is a very accessible and fun skill to develop.”



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GETTING STARTED

Choose the right camera and accessories for you

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It's a popular myth that more choice is always better. In fact too much choice often just leads to confusion and poorly informed decisions, particularly when it comes to buying things like cameras. With hundreds of different cameras of many different styles and capabilities to choose from, and a substantial quantity of your hard-earned money at stake, choosing the wrong camera could prove to be an expensive and frustrating mistake. In this first section we'll try to help you clear away some of that confusion and give you the information you need to choose the right camera for you.

If you wander around your local camera shop or browse any of the dozens of online photographic retail sites, you'll quickly become aware of the bewildering array of hardware that is available, much of it very expensive. There are shelves and web pages full of cameras of all shapes and sizes, as well as lenses, flashguns, tripods and more; and deciding which one is right for you can be a nightmare. Good advice is essential, and that's why we're here to help.

Over the next few pages we'll look at the many different types of camera that are available, explain a little about how they work, and also look at some of the accessories that are available to help you take better photos. ■





“Good advice is essential and
that’s why we’re here to help.”

Types of digital camera

There are many kinds of digital camera, so which one is right for you?



Digital cameras come in all shapes and sizes, with a wide variety of different features and functions. They can vary in price from under £100 to over £30,000, so if you want to buy a new camera it's important to know what sort you need. Buying the wrong one could prove to be an expensive mistake! Let's take a quick look at the different types of camera that are available.

Compact cameras

The category of Compact Cameras covers a wide and varied range of camera types. The term "compact" in this context has nothing to do with the size of the camera, and merely means a camera with an integrated, non-removable lens. The distinctions between different types of compact camera have become rather blurred of late, but broadly speaking they fall into the following sub-categories:



Standard compact

Most compact cameras fall into this category. They tend to be fairly small and light, measuring about 100 x 50 x 25mm and weighing around 120-130g. Modern standard compacts are normally fully automatic, although some may offer basic manual exposure options. They usually have a zoom lens of up to 10x which folds flush with the camera body and an LCD monitor of about 7cm diagonal size. Prices start at about £60 for budget models, up to around £300 for luxury models. Extra features may include such things as HD video recording, image stabilisation or Wi-Fi connectivity, and they often come in a range of cool colours and finishes.



Zoom compact

Zoom compacts, also sometimes known as Travel Cameras, are broadly similar to standard compacts, but are equipped with more powerful lenses, some as large as 30x zoom. Most have robust metal bodies, high-capacity batteries and large monitor screens; many also feature HD video recording and optical image stabilisation. They are usually larger than standard compacts, with bodies that incorporate a small handgrip for more comfortable handling, and the lenses do not usually fold completely flush with the body. Many models now also have optional manual exposure features, and some include built-in GPS for automatic geotagging of your travel pictures. Prices start at around £150, going up to around £700 for luxury models.



Adventure cameras

A category that has been growing in popularity, Adventure Cameras are designed to be used outdoors in extreme conditions. They are waterproof, many are also shockproof, and a growing number are also advertised as being "freezeproof", although that seems to be taking things to the absolute extreme. In terms of capabilities most adventure cameras are similar to standard compacts, with up to 5x zoom lenses that are usually non-protruding and protected behind toughened glass ports. Prices start at around £90 for basic models, going up to around £400 for the most capable models.



Advanced compact

Advanced compacts are designed for more experienced photographers, and offer superior photographic versatility and quality, as well as advanced creative features such as manual exposure controls, manual focusing, optical viewfinders and external flash connections. They are considerably more expensive than other types of compact, with prices ranging from around £300 to over £500. Examples include the Panasonic Lumix TZ100 and the Canon PowerShot G7X. There is an even more rarefied category that has appeared more recently of advanced compacts with larger sensors. Notable examples include the Sony RX1R II, the Sigma dp0 Quattro and the Leica Q. Prices can range from around £500 to well over £3000.

Smartphone cameras

There is no getting away from it, the smartphone has turned the idea of a point-and-shoot camera on its head. These days, if you are after a quick, no nonsense, shot like a selfie or some random event where trying to set up a DSLR is too slow, then these are ideal. Smartphone imaging technology has come a long way and your average smartphone is now capable of shooting 16 megapixels with impressive low-light capability for such a compact device. Moreover, many smartphones now have the main camera backed up with a front-facing, lower resolution, 'selfie' cam as well. All the major players such as Apple, Samsung, LG and HTC have a wide range of phones with increasingly complex camera technology built in as standard.



Super-zoom

Super-zoom cameras used to be called "bridge cameras", since they were seen as half-way between compact cameras and DSLRs, but they have been falling out of favour over the past few years as zoom compacts and CSCs encroach ever further into their traditional territory. Nonetheless there are still a number of super-zooms on the market, and most of them are very capable cameras. They are usually quite large, with SLR-style bodies including big hand grips and electronic viewfinders. All offer powerful zoom lenses, some as much as 50x zoom, and usually include optical image stabilisation. Most also feature advanced HD video recording, often with stereo audio, and some also include advanced photographic features such as manual exposure and flash hot-shoes. Prices start at around £170, going up to nearly £400 for the more advanced models.

Digital SLR

The first digital SLRs (DSLR) were introduced in the late 1990s, and were based on earlier film cameras. They have interchangeable lenses, and most digital SLRs can use the same lenses as their older film-based predecessors. With specialist lenses available for particular tasks. SLR systems are the choice of most serious amateur and professional photographers, and most offer superb image quality. Most DSLRs use a sensor size called "APS-C" but a few top-end cameras use larger "full-frame" sensors the size of a 35mm film frame. Prices start from about £400 for an entry-level APS-C model with a standard lens, while a top professional full-frame model such as the Canon 1DX MK2 seen here costs £4,800 just for the camera body!



Compact system cameras

Compact system cameras (CSC) have interchangeable lenses, allowing photographers to choose a particular lens for a particular task, and also have a range of other accessories such as flashguns. The first compact system camera was the Panasonic Lumix G1, launched in 2008. They offer most of the versatility and image quality of digital SLRs, but in a smaller, lighter and in most cases less expensive package. They are a good choice for the hobby photographer who wants to extend their range, but who doesn't want to be dragging a heavy bag of full-sized lenses around. There is a wide variation in quality and capability between the various brands and models though, and prices range from less than £300 to over £1,200. Some makers have only released a few extra lenses as yet, so it pays to do some homework and read product reviews before making your choice.

Medium Format

If even a full-frame DSLR isn't quite good enough for you, you could always try a digital Medium Format camera, which has an even larger sensor. The Phase One XF 100MP shown here has a resolution of 100 megapixels and amazing picture quality, but it doesn't come cheap. With a standard lens it will cost you around £35,000!



Decisions, decisions

A number of cameras to pique your interest

There are many different types of digital camera, and choosing the right one for you is a difficult decision. Depending on what type of camera you're looking for you could be spending hundreds or even thousands of pounds; a significant sum of money for most people, so it's important to make the right choice.

The first question is how much do you want to spend? Naturally you want the best camera you can afford, but there's no point spending more than you need. The best option is to set yourself a budget and stick to it. As with any gadget there's always the temptation to spend a little bit more to get that one extra feature, but when it comes to cameras this could quickly become very expensive. Decide which features you actually need, then start looking for the camera that meets your needs and is within your budget.

With all that in mind, here is a selection of the current crop of cameras from both ends of the scale; hopefully, it may pique your interest and point you in the right direction. ■



Sony A7R II

Mirrorless full-frame camera - £2019/\$3199/€2582

- 5-axis stabilisation
- 42.4 megapixel full-frame sensor
- 4K movie recording



Canon EOS 80D

Cropped sensor DSLR - £799/\$1199/€1021

- High speed 7 fps shooting
- 24.2 megapixel CMOS sensor
- 3.0 inch vario-angle touch screen LCD



Panasonic Lumix GF8

Mirrorless system camera - £379/\$517/€484

- Kit lens 12-32mm f/3.5-5.6
- 16 megapixel live MOS sensor
- Full HD video recording



Canon 1DX Mark II

Flagship full-frame DSLR - £4500/\$5999/€5754

- 16 fps Live View shooting
- 20.2 megapixel full-frame sensor
- ISO range 100-409600



Nikon D5

Professional DSLR - £4699/\$6495/€6009

- 20.8 megapixel full-frame CMOS sensor
- EXPEED 5 image processor
- 4K ultra high definition video



Fujifilm X-Pro 2

Mirrorless system camera - £1279/\$1699/€1635

- Advanced hybrid multi viewfinder
- 24.3 megapixel CMOS III sensor
- Shoots 8.5 frames per second



Polaroid Socialmatic

Instant print camera - £275/\$325/€351

- Instantly print on ZINK photo paper
- 14 megapixel sensor
- Shoots 8.5 frames per second



Olympus Tough TG-870

Waterproof action camera - £239/\$229/€305

- 21mm ultra-wide lens
- 16 megapixel sensor
- Waterproof, shockproof and freezeproof



DSLR and CSC lenses

Expand your system with extra lenses

The major advantage of SLR and CSC type cameras is the ability to change lenses to suit different photographic needs. In most cases the lens is attached using a bayonet-type mounting system, and can be



quickly removed by pressing a release button and twisting. The longer established camera systems, primarily Nikon, Canon, Pentax and Sony, have wide ranges of different lenses available, and are also compatible with many older lenses designed for use with film cameras. Although Sony is a relative newcomer to the digital SLR market, launching its first model in 2006, it uses the lens mount system it inherited from Konica-Minolta and current Sony DSLR cameras can use many old Minolta lenses.

Olympus abandoned its old OM-system lens mount when it switched from film to digital SLRs, opting instead for the smaller Four-Thirds mount and sensor system co-developed with Panasonic. As a result older Olympus OM lenses are not compatible with the company's modern DSLR cameras, although the current Olympus E-system lens range is quite extensive. Some systems, particularly compact systems such as the Samsung NX and Sony's NEX still have comparatively few lenses, but more are being added to these ranges on a regular basis. The popular Panasonic G-Micro system now has a wide selection of lenses, including a unique 3D binocular lens. Sony has got around this problem to some extent, because an adapter is available that lets its compact NEX cameras use existing Sony Alpha and even old Minolta A-mount lenses.

Prime versus zoom

Lenses can be divided into two main categories: zoom lenses, which have a variable focal length; and prime lenses, which have a fixed focal length. Zoom lenses have the advantage that they are more versatile, so just a couple of lenses can cover a wide range of focal lengths, but they also have several disadvantages. They are heavier than prime lenses, the optical quality is usually not quite as good, and they usually have a smaller (slower) maximum aperture. Prime lenses, conversely, are lighter and usually of better optical quality, but you have to carry more of them to cover a range of focal lengths. Both types of lenses are available in a huge range of sizes and prices, from cheap standard 50mm lenses to ultra-fast telephoto zooms costing over £10,000.

There is actually relatively little difference in price-per-focal length between zooms and primes; both vary widely depending on quality, focal length and maximum aperture, with both popular and premium varieties of both types.

Some photographers prefer the convenience of zoom lenses, others prefer the superior performance of prime lenses, while others prefer to use a mixture of prime and zoom lenses depending on the circumstances.

The number of lenses available for compact system cameras grows by the day. As does the number of lenses for DSLRs. There certainly is a great choice.

TYPES OF LENSES

Pancake lens

Typical focal length:
Wide, Normal, Telephoto



Simply put, a pancake lens is a very flat prime lens. It is shorter than it is wide and it is very small and light. They are used primarily by photographers who are after a small and compact camera/lens system. They are used with DSLR and Micro Four Thirds cameras. Relative to their diminutive size, they can produce very good images.

Standard zoom

Typical focal length:
28-80mm (full-frame equivalent)



This is the most common focal length, suitable for general photography and useful for everything from landscapes to portraits. Most systems will include a couple of lenses in this focal length range, usually a cheaper, slower version often included as a kit lens with a new camera, and a premium quality lens often costing a lot more.

Ultra-wide zoom

Typical focal length:
16-35mm (full-frame equivalent)



Ultra-wide-zoom lenses are primarily used for landscape photography. They are more specialised than standard zooms, and consequently are usually more expensive, although some systems include both standard and premium types.

Macro lens

Typical focal length:
50-100mm (full-frame equivalent)



A true macro lens by definition should be able to record an image at 1:1 scale on the sensor or medium it was shot on at its closest focusing distance. This magnification factor means that a macro lens is able to fill the frame and reveal amazing detail on very small objects.

Medium telephoto zoom

Typical focal length:
80-300mm (full-frame equivalent)



The medium telephoto zoom is useful for amateur wildlife or sports photography, or portraits at the shorter end of its focal length range. Telephoto zooms have a smaller effective aperture than standard zooms.

Specialist lenses

Typical focal length:
400-1200mm (full-frame equivalent)



Specialist lenses are used mainly by professionals and advanced enthusiasts. These include both zoom and prime ultra-fast telephoto lenses used by sports and wildlife photographers.

CONVERSION FACTORS

DSLR and CSC lenses are often described in terms of their focal length. This is a measure of the distance from the lens to the sensor or medium it is shot on. The focal length of a lens is a measure of its ability to focus light. A lens with a focal length of 50mm will focus light from a subject 50mm away onto the sensor or medium it is shot on.

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Tripods

The best way to eliminate camera shake

If you want to take better photographs, the single most useful accessory you can buy is a good quality tripod. By using a tripod you can completely eliminate camera shake, the number one cause of unsatisfactory photos. A tripod is also essential when using long exposures, powerful telephoto lenses or when shooting in low light conditions.

There are many different makes and types of tripod, from cheap budget models costing under £15 up to professional-grade tripods made of carbon fibre and magnesium alloy which cost hundreds of pounds. They come in all sizes too, from pocket-sized mini-tripods suitable for small compact cameras, to heavy studio tripods mounted on castors. The type that you should buy depends on how much you want to spend and what sort of photography you're going to use it for.

Key factors when choosing a tripod are rigidity and carrying weight. The tripod you choose has to be able to support the weight of your camera and hold it perfectly still. Some cheaper tripods with plastic heads and thin aluminium legs are too 'bouncy' to be used with anything heavier than a compact or light superzoom. Set the tripod up and press down on the top of it. If it flexes by more than a few millimetres it's not going to be stiff enough to support a heavy camera. ■



The Manfrotto Pixi is a tiny but durable tripod. Shown here with the optional cameraphone holder, it is capable of holding the weight of entry-level DSLRs.

“Key factors when choosing a tripod are rigidity and carrying weight. The tripod you choose has to be able to support the weight of your camera and hold it perfectly still.”

MONOPODS



TYPES OF TRIPOD

POCKET TRIPODS

These are miniature tripods designed for small compact cameras, and are ideal for table-top use, or for positioning your camera for a self-timer group shot. They're small enough to slip into a jacket pocket or into your camera pouch. There are several different types, including ones with telescopic legs, ball or pan-tilt heads, and even flexible legs. One unique and extremely versatile design is the Joby Gorillapod, which can grip onto almost any object or work as a tripod.



BUDGET TRIPODS

There are many cheap tripods on the market, many costing less than £20. There are some very good ones, such as this Hama Star 75, but many lack the rigidity to support heavier cameras and lenses.



TRAVEL TRIPODS

Travel tripods are designed for general use where low weight and portability is an important factor. They are made of lightweight materials, usually aluminium or carbon fibre, and are suitable for most types of camera from compacts up to mid-range DSLRs, although not with large telephoto lenses.



PROFESSIONAL-GRADE TRIPODS

Top quality tripods are made from high-tech materials like carbon or basalt fibre, with magnesium alloy fittings and superior workmanship. They offer the best rigidity and support for even the heaviest cameras and lenses, but they are very expensive. The Gitzo Mountaineer Series 1 seen here costs over £800.





USING YOUR CAMERA

Learn how to get the most out of your camera

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Modern digital cameras are marvels of miniaturised technology, with many automatic functions to help you take good photos in a wide range of different situations. However by learning more about how your camera works and how to use its many features you can expand the scope of your photography and get good results every time, even in difficult conditions. For owners of more advanced cameras there are options such as aperture and shutter speed control, sensitivity and white balance, as well as creative light

metering modes and manual focusing, all of which can be used creatively to make your photos really stand out. It's just a case of getting to grips with the basics of photography and your camera gear.

Photography is a rewarding and potentially profitable hobby, and the more you learn about it the more you'll get out of it! In the next section we'll look at common camera features and how to use them. So read on and find out how that expensive gadget you bought actually works! ■

“Photography is a rewarding and potentially profitable hobby, and the more you learn about it the more you’ll get out of it.”



Basic composition

The simple rules that make a good picture great

The addition of elements in a scene can make or break a photograph. If you cover up the boat in the lower left of the shot with your thumb, does the shot seem unbalanced and incomplete without it?

The main difference between a well taken snapshot and a truly artistic photograph is simply a matter of composition. By changing the focal length, the angle and the position of the camera, the photographer can change the relative positions and sizes of objects in the frame to produce a more visually pleasing effect. Learning to do this is mostly a matter of practice and experimentation, but there are a number of simple tips and rules-of-thumb that can help you to take better pictures.

The first and most important thing to remember is to take your time. Look at the scene in the viewfinder or on your monitor and try to see it not as simply a view but instead to imagine it as a finished print.

Ask yourself if there's any way that it can be improved by maybe zooming in a little, or by moving the camera. A tripod is a very useful tool for this compositional process, since it lets you view a

completely static image without having to hold the camera steady.

The Rule of Thirds

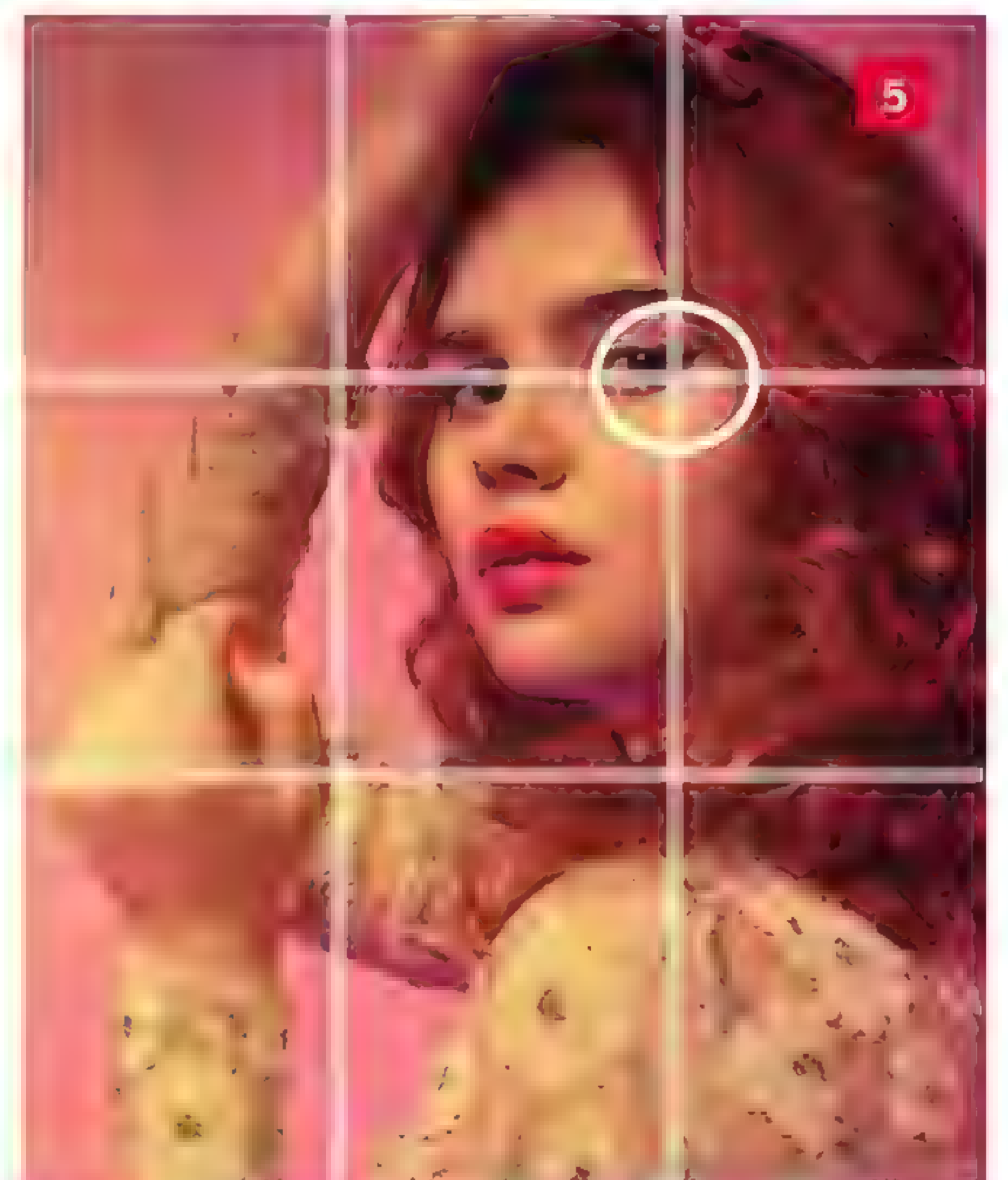
The most commonly used compositional technique is called the Rule of Thirds, and it's really very simple. Let's take a look at an example landscape picture [1]. It's a nice enough shot, correctly exposed, in focus and nicely lit, but now look at the next example [2]. Doesn't that look better? It's obviously the same scene, and taken from roughly the same position, but this composition is much more appealing. The reason it works is because the lighthouse is now positioned off-centre in the frame, in fact it is one third of the distance from the right to the left. This type of composition is known as the Rule of Thirds.

The best way to apply the Rule of Thirds is to imagine the frame divided up into thirds both

vertically and horizontally, rather like a Noughts and Crosses (Tic Tac Toe for those in the USA) grid [3]. If you position the main elements of the image on these imaginary lines, or better yet on the intersections where the lines meet, you'll find that your image will look a lot more pleasing to the eye.

The Rule of Thirds works just as well in vertical-format shots, and is useful in landscape photography, since features on the horizon makes a natural dividing line [4]. Portraits can also benefit from Rule of Thirds composition. By positioning a subject's eye at a point where the imaginary lines intersect [5], will give your portrait balance and really help to draw the viewer's attention into the picture.

Most digital cameras feature an option to superimpose the Rule of Thirds grid on the monitor screen to make this type of composition easier. Now you know why it is there. ■



“Look at the scene in the viewfinder or on your monitor and try to see it not as simply a view but instead to imagine it as a finished print.”



Exposure and metering

Accurate exposure is the key to good photography

Understanding exposure and how it affects your photographs is probably the single most important technical skill you can learn in photography. It's certainly the one that most people get wrong, and apart from camera shake, bad exposure probably ruins more photos than any other single cause. The main problem is over reliance on automatic metering.

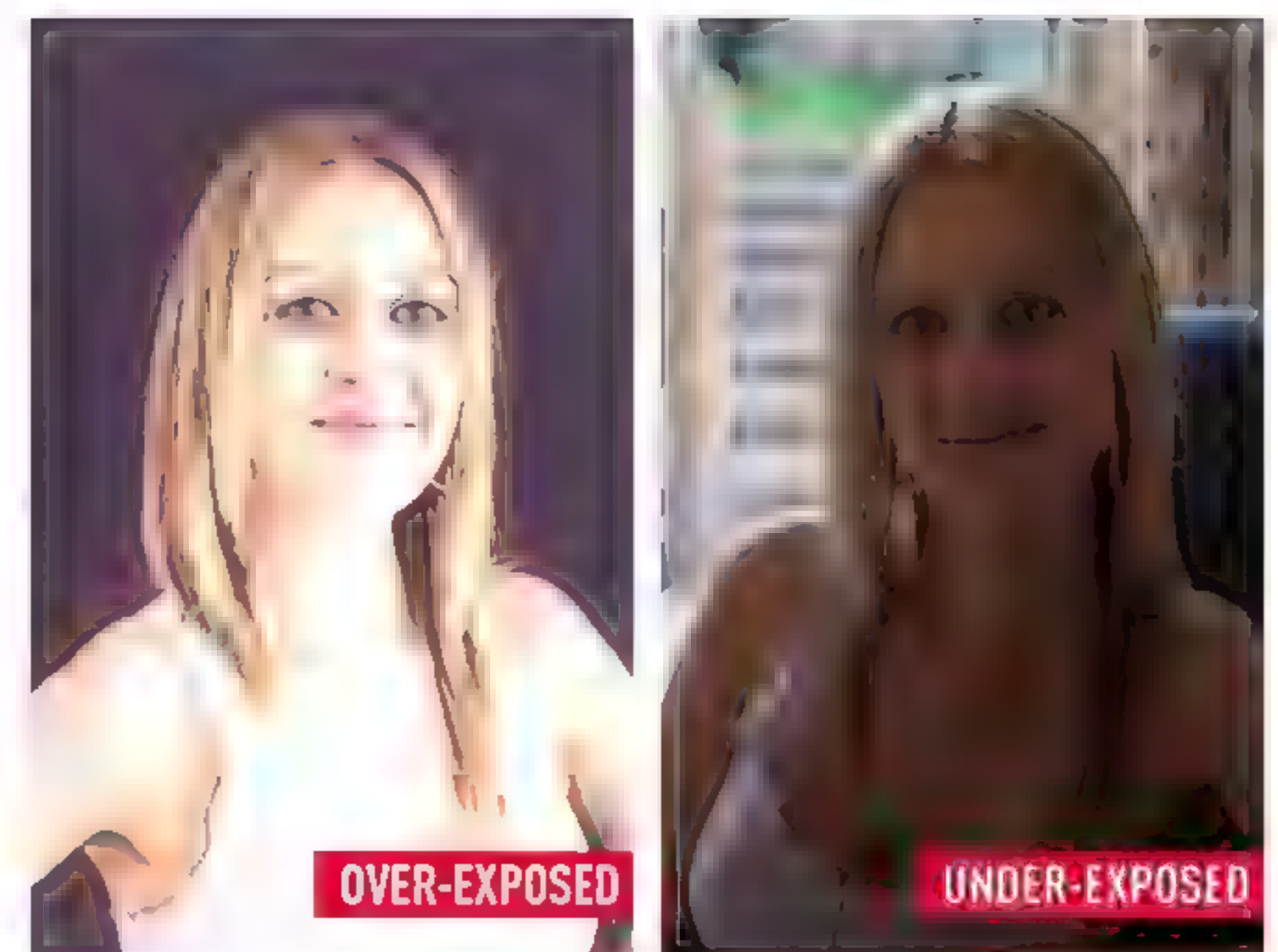
Most modern cameras, even relatively cheap compacts, have sophisticated built-in TTL multi-zone evaluative exposure meters that measure light levels at dozens, in some cases hundreds, of points within the frame, instantly comparing the results with a built-in library of exposure situations and automatically adjusting the shutter speed and aperture to deal with problems such as back-lighting, close-ups or moving subjects.

In most cases these automatic exposure systems are very good, and can reliably cope with

most common circumstances. However even the best automatic meter can be fooled, resulting in poorly exposed photos. By overriding the camera's automatic settings and adjusting exposure manually we can avoid these problems and take much better photos.

Let's take a look at a couple of examples. In this first scene we have a fairly ordinary portrait of a brightly lit light skinned model shot against a very dark background. This was taken using a typical compact camera set on automatic exposure. As you can see the camera has badly over-exposed the model's face, losing details in the highlight areas.

In this second example the same camera has been used to photograph the same model, but this time standing in front of a brightly lit window. In this case the camera's automatic exposure system has seriously under-exposed the shot, leaving the model's face in deep shadow with little detail visible.



The same usually reliable exposure meter took both of these shots, so what went wrong? In order to understand what happened and accurately correct it, it is necessary to know how light meters operate, and the rules by which exposure is calculated.



FIG 1. ORIGINAL SCENE

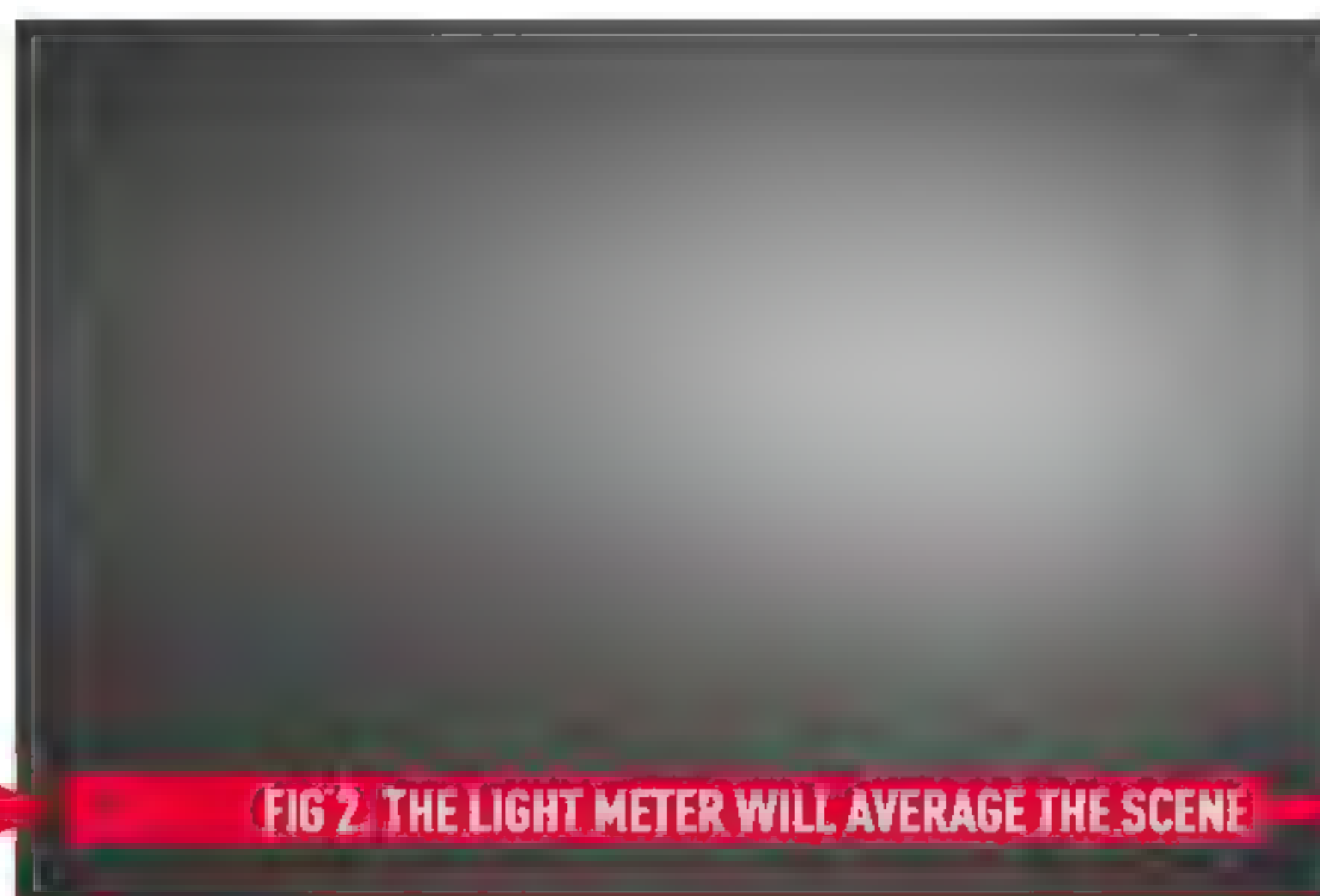


FIG 2. THE LIGHT METER WILL AVERAGE THE SCENE

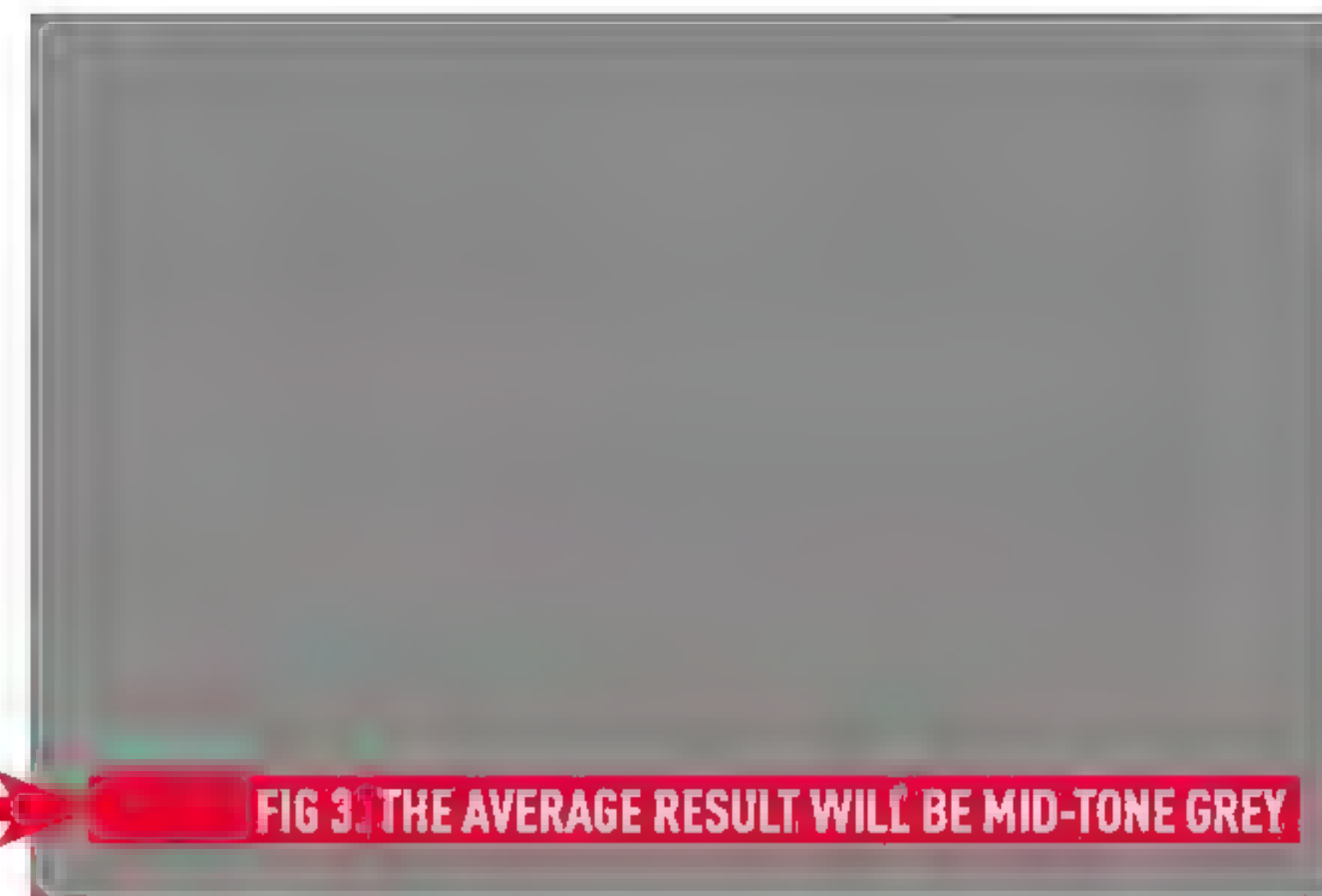


FIG 3. THE AVERAGE RESULT WILL BE MID-TONE GREY



SMALL APERTURE



LARGE APERTURE

“Apart from camera shake, bad exposure probably ruins more photos than any other single cause. The main problem is over reliance on automatic metering.”

Fade to grey

Take a look at the main picture above. What you see there is a nice scene of a classic car on Dartmoor in the evening, with a good tonal range, plenty of colour and some nice crisp sunlight. What your camera's light meter sees is very different as our example above shows. Try it out for yourself. Find any nice, average snapshot scene, properly lit and with good contrast like our example **FIG 1**. Start up your image editing software and open your picture. Light meters only see in black and white, so reduce the saturation of the shot to zero. Your light meter doesn't see detail, so set your Gaussian blur filter **FIG 2** to maximum diameter and apply it a couple of times. Use the eyedropper tool to measure the RGB colour value of the resulting tone. You should find that it averages out to a mid-tone grey **FIG 3** with an RGB value of around 127,127,127.

It's an interesting and curious fact that any

average scene reflects 18% of the light falling on it. Look out of your window, and unless you live in Antarctica the scene you see is reflecting exactly the same amount of light as the scene out of my window. That 18% reflection is exactly the same as a mid-tone grey, midway between black and white.

Light meters are calibrated with this fact in mind. When your camera takes a light reading, the meter averages the scene and adjusts the exposure to produce that mid-tone grey (or 12% luminance, but that's another discussion altogether). If you point the camera at a black stage curtain, it will try to make the black into a mid-tone grey, so it will over-expose. If you point it at snow it will try to make the white into grey, so it will under-expose.

Adjusting exposure

Let's take a moment to explain how exposure is controlled, and what is meant by some of the

terminology. If you already know the basics, feel free to skip to the next page.

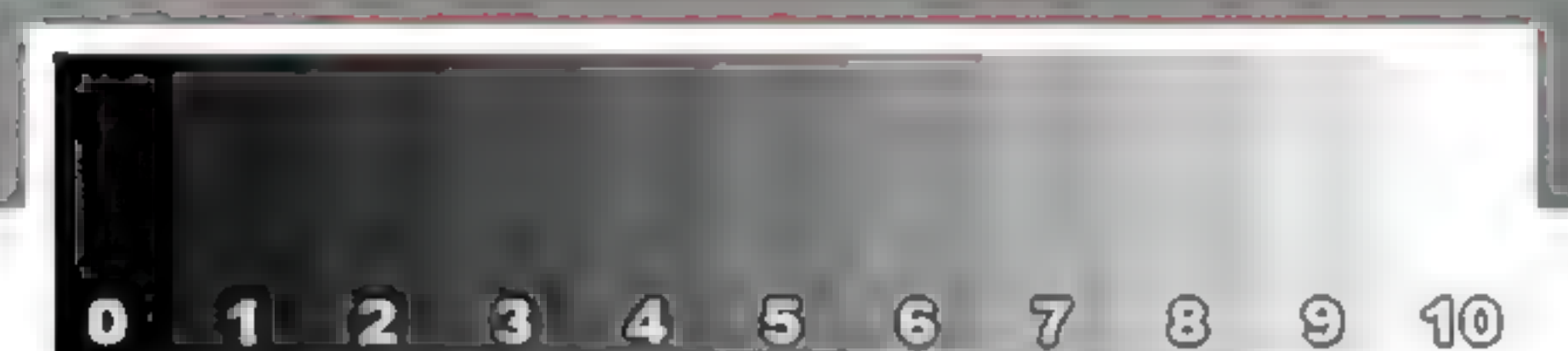
On all cameras, exposure is adjusted by altering two settings; aperture and shutter speed. Between them they control the amount of light that hits the sensor when the shot is taken.

Shutter speed is self-explanatory, it is simply the amount of time that the sensor is exposed to light. This is usually controlled by an electrically operated mechanical shutter in front of the sensor that opens and closes very quickly for a precisely measured period of time, usually in the order of a few hundredths of a second. Obviously a shutter speed twice as long lets in twice as much light, one half as long lets in half as much.

The aperture is literally just a hole through which light passes on its way to the sensor. The diameter of that hole can be adjusted to precisely calibrated sizes. A smaller hole lets in less light, and a larger hole lets in more.



THE TETONS AND THE SNAKE RIVER BY ANSEL ADAMS 1942



These calibrated aperture sizes, for largely historical reasons, are called stops, or f-stops. An aperture setting one stop larger lets in twice as much light. For reasons that are both historical and mathematical, the standard full-stop aperture settings that you are most likely to encounter go f/1, f/1.4, f/2, f/2.8, f/4, f/5.6, f/8, f/11, f/16 and f/22. The smaller numbers refer to larger apertures, and the larger numbers to smaller ones. Many cameras can set apertures in increments of 1/3rd of a stop, but the whole-stop numbers are the ones to remember.

Let's consider an example. With your camera set to automatic exposure point it at a scene and take a light reading. For the sake of argument, say the light meter sets an aperture of f/8 and 1/200th of a second. You can produce the same exposure by increasing the aperture by one stop to f/5.6 and halving the shutter speed to 1/400th of a second, because this lets the same amount of light through to the sensor. Similarly, reducing the aperture to f/11 and setting the shutter speed to 1/100th of a second will also produce the same exposure.

However by altering one setting without altering the other you will change the exposure. In our example, changing the aperture to f/5.6 but leaving the shutter speed at 1/200th of a second will

increase the exposure by one stop, or one exposure value (EV), making the picture brighter. Decreasing the aperture to f/11 will reduce the exposure by one EV, making the picture darker.

Similarly, changing the shutter speed while leaving the aperture alone will also change the exposure. Double the shutter speed to 1/400th at f/8 and you reduce the exposure by one stop, halve the speed to 1/100th and you increase the exposure by one stop.

The Zone System

In 1939-40 the pioneering photographers Ansel Adams and Fred Archer developed an exposure system based on this fact, a system that is still used today. It is called the Zone System, and is quite possibly the most useful piece of photographic knowledge you'll ever learn. There are several

variations on the original system, but I'll go with the one that is easiest to understand.

Starting with 18% grey as the mid-point, the system divides all the tones between black and white into 11 zones, numbered 0-10. Zone 0 is featureless black with no details visible, which in your image editor would have an RGB value of 0,0,0. Zone 10 is pure white with no details visible, and an RGB value of 255,255,255. The mid-tone 18% grey is zone 5, and should have an RGB value of about 127,127,127.

The zones represent exposure values, or EV. The difference between one zone and the next is equivalent to the difference between one exposure setting and another one exactly one stop higher or lower.

“The difference between one zone and the next is equivalent to the difference between one exposure setting and another one exactly one stop higher or lower.”

PUTTING IT ALL TOGETHER

If we relate the tone scale of the Zone System scale to real world objects we can use it to help produce accurately exposed photos. The zones are roughly equivalent to the following scene elements (adapted from Adams' descriptions).

Zone 0	Pure black, no details or texture visible.
Zone 1	Black tone but no texture. This is normally as black as you want to get in a picture.
Zone 2	First hint of texture and detail, very deep shadow.
Zone 3	Dark materials, details visible.
Zone 4	Dark foliage. Dark stone. Landscape shadow. Shadow on portraits in sunlight.
Zone 5	Clear north sky. Dark skin. Grey stone. Weathered wood. 18% mid grey.
Zone 6	Average Caucasian skin value. Light stone. Shadows in sunlit snow.
Zone 7	Very light skin. Light grey objects. Snow with side lighting.
Zone 8	White with texture. Snow in shade. Highlights on Caucasian skin.
Zone 9	Glaring white surfaces. Snow in flat sunlight. White without texture.
Zone 10	Light sources, reflections of sunlight on metal. Pure white.

Let's go back to the two troublesome portraits from the first page. If we use the spot meter to take a reading from the subject's face, we know that the light meter will give a reading that would make the face mid-tone grey, which is zone 5. However from the zone chart we know that average Caucasian skin should be zone 6, so we need to increase the spot metered exposure by one stop, in this case from 1/30th at f/5.6 to 1/30th at f/4. In the resulting shot the background details are all burned out, but the subject is correctly exposed.

For the over-exposed portrait against the dark background, we can use a similar approach. Spot metering the background gives an exposure setting of 1/3rd sec at f/5.6 to render it as zone 5 mid-grey. By reducing that exposure by four stops to 1/3rd at f/22 we can make the background come out as what it should be, zone 1 black, leaving the model's face also correctly exposed.

The zone exposure system can help with difficult exposures, but it is helpful in another way. Learning to think of images in terms of tone and dynamic

range will encourage you to approach these concepts in a creative way, and to use them to produce better pictures. Controlling exposure is the primary creative tool of the photographer, and learning how to use it will make the difference between mere snapshots and artistic photographs. This system has been used by professional photographers for over 70 years. Used properly, it can help to improve your photography immensely, probably more than any other single technique.



“The zone system can help with difficult exposures. Learning to think of images in terms of tone and dynamic range will encourage you to approach these concepts creatively.”

Focusing

Getting the best out of your autofocus system



Some digital SLRs can use older manual focus lenses. Obviously they won't auto-focus, but the camera's AF system will tell you when the picture is in focus.

With only one or two exceptions, all current digital cameras have automatic focusing. The first autofocus systems were developed by Leica in the 1970s. The first autofocus compact camera, the Konica C35 AF, was introduced in 1977, and the first autofocus 35mm SLR, the Pentax ME-F, was launched in 1981. Since that time autofocus technology has improved immensely, and these days even the most basic modern AF systems are generally fast, accurate and reliable.

Although we now rely on autofocus for the vast majority of photographs, anyone who has tried taking a photo in low light, with fast-moving subjects or using very long telephoto lenses will have noticed that sometimes even the best AF system can run into problems. We've all stood there with the lens whirring in and out of focus, trying to get a lock on our subject, and eventually missed the shot. It's very frustrating when this happens, but with a few simple tips you can help your camera to focus quickly and accurately even



Different lenses have different minimum focusing distances, but many modern zoom telephoto lenses also have macro-focusing capabilities for close-ups.



“Autofocus technology has improved immensely, and these days even the most basic modern AF systems are generally fast, accurate and reliable.”



By carefully focusing on just one part of the scene, and using limited depth of field, you can draw attention to it.

in difficult situations.

There are two main types of autofocus system in common use today. All compact cameras and most CSCs use something called contrast-detection AF, which samples the image from the main picture taking sensor and detects sharp high contrast edges in the details of the scene. Meanwhile all digital SLRs and Sony's new SLT cameras use something called phase-detection AF, which uses an array of separate dedicated sensors usually

mounted below and in front of the main imaging sensor. Phase detection is a more complex system, but it is usually much faster, more accurate and works better in low light. However both systems require some detail in the scene to 'lock on' to. Try it for yourself: point your camera at a plain wall or a sheet of white paper and see if it will focus on it. Even if you own a top-of-the-range DSLR it won't be able to focus on a featureless surface.

There are a couple of ways to help your

camera to focus quickly on a scene. Most digital cameras have the option to select either single or continuous autofocus. Your camera will normally start to focus on the scene as soon as you half-press the shutter button. In continuous focus mode it will continue to update the focus if you then move the camera, but in single AF mode it will hold the same focus setting as long as you hold down the button, until you actually take the shot. You can use this to focus the camera on low detail targets by finding an object in the scene that's the same distance away as your chosen subject, focusing on that, and then holding the focus and reframing the shot. Similarly you can use it in reverse to focus on objects that aren't in the centre of the frame.

Moving targets

Compact camera AF systems are usually somewhat slower than those in DSLRs, which means they can have a real problem focusing on moving subjects. The way around this is either to use continuous AF or, if your camera has this option, to use manual focus. If you can tell where your subject is going to be, such as a car going round a tight corner on a race track or a child on a swing, you can pre-focus the camera on this point and wait to take the picture at the right moment. This method takes some practice and good reflexes, but it can produce excellent results.

Close-ups

All cameras and lenses have a minimum focusing distance, a closest point beyond which they cannot focus. For many compact cameras this distance can be very small, in some cases as little as 2cm (1in), but for standard DSLR lenses the distances tend to be longer. Most compact cameras have a 'macro' setting, usually denoted by the symbol of a flower. To get closer focusing with a DSLR or CSC, special close-focus macro lenses have to be used.

Depth of field is greatly reduced at very close focusing distances, and you may find that your AF system doesn't focus on the right part of the subject, for example if you are trying to photograph the centre of a flower, but the AF focuses on the petals, because they're closer. The best option is to use a tripod, and manually set the focus to the closest distance. Move the tripod until the front of the subject comes into focus, then carefully manually adjust the focus point to get the right part of the flower to look sharp. ■



Shutter speed and camera shake

The shutter of your camera is simply a mechanical barrier

“The wider the range of available shutter speeds, the greater the creative versatility of the camera.”

The shutter of your camera is simply a mechanical barrier that prevents light from entering the camera until it is needed, controlling when and for how long light is allowed in to expose the sensor. The latest digital cameras have high-speed electro-mechanical shutters capable of timing exposures with an accuracy measured in fractions of a millisecond.

Along with the aperture setting and the sensitivity control, shutter speed is one of the three ways that photographic exposure is adjusted. When a picture is taken, the shutter is opened for a precisely measured amount of time allowing light to pass through. The duration of the exposure is set either automatically by the camera's light meter or manually by the photographer. The wider the range of available shutter speeds, the greater the creative versatility of the camera.

Modern digital SLR cameras have a very wide range of shutter speeds available, usually ranging from 30 seconds to as high as 1/8,000th of a second, and most also have a 'B' setting, in which the shutter stays open for as long as the shutter release is held down. The 'B' is from bulb. Very old cameras commonly used an air-bulb attachment as a remote shutter release.

Shutter speed can be manually adjusted in either full manual exposure mode or in shutter priority mode, the latter usually denoted by an 'S' or 'Tv' on the exposure mode dial. Shutter priority is a semi-automatic exposure mode in which the photographer sets the desired shutter speed, and the camera's exposure system adjusts the aperture accordingly to produce the correct exposure.

In automatic and program exposure modes the camera will set both the shutter speed and aperture automatically. Under normal daylight conditions, the shutter speed will usually be set to between 1/125th and 1/1000th of a second, since this is fast enough to freeze most movement and to reduce the effects of camera shake. However in low light conditions the camera may set a slower shutter speed, and with this comes an increased risk of movement blur caused by camera shake. Most cameras will display some sort of warning if this occurs. ■

AVOIDING CAMERA SHAKE

When shooting hand-held and wishing to avoid camera shake, as a rule of thumb you can safely use a shutter speed roughly equivalent to the reciprocal of the focal length you are using. For example if you're using a 100mm focal length then you can take a sharp hand-held shot at a shutter speed of 1/100th of a second or faster. If you're using a 35mm focal length then 1/35th of a second is safe, and so on.

Here's an example shot taken hand-held at a focal length of 100mm and a shutter speed of 1/100th of a second. As you can see it's sharp and shake free.



Here's the same hand-held shot but this time with a shutter speed of 1/10th of a second. At this speed and focal length it's much more difficult to hold the camera steady. As you can see, the result is quite blurred.

Many modern cameras include technology which can reduce the effects of camera shake at low shutter speeds. Many compact cameras use electronic processing to counteract movement, which does work but produces relatively poor image quality. Among digital SLR and CSC manufacturers there are two types of image stabilisation in common use. Canon, Nikon and Panasonic favour optical stabilisation, where elements within the camera lens are moved to counteract camera shake. Other brands including Pentax and Sony employ a system which moves the camera's sensor to achieve the same effect.

There is no clear advantage between moving-lens and moving-sensor systems. Modern image stabilisation systems of both types can provide around three or four stops of additional stability, however the sensor-shift method has an advantage for SLR users because the non-stabilised lenses are usually considerably lighter and are often also cheaper to buy, since the complex anti-shake system is built into the camera body. It also means that photographers using older predigital lenses can still have the advantage of image stabilisation.

This example shot was taken with a focal length of 100mm at 1/10th of a second as before, but this time the image stabilisation (in this case a sensor-shift system) is switched on. It has detected the vibration and corrected it by moving the sensor to compensate, resulting in a much sharper shot.



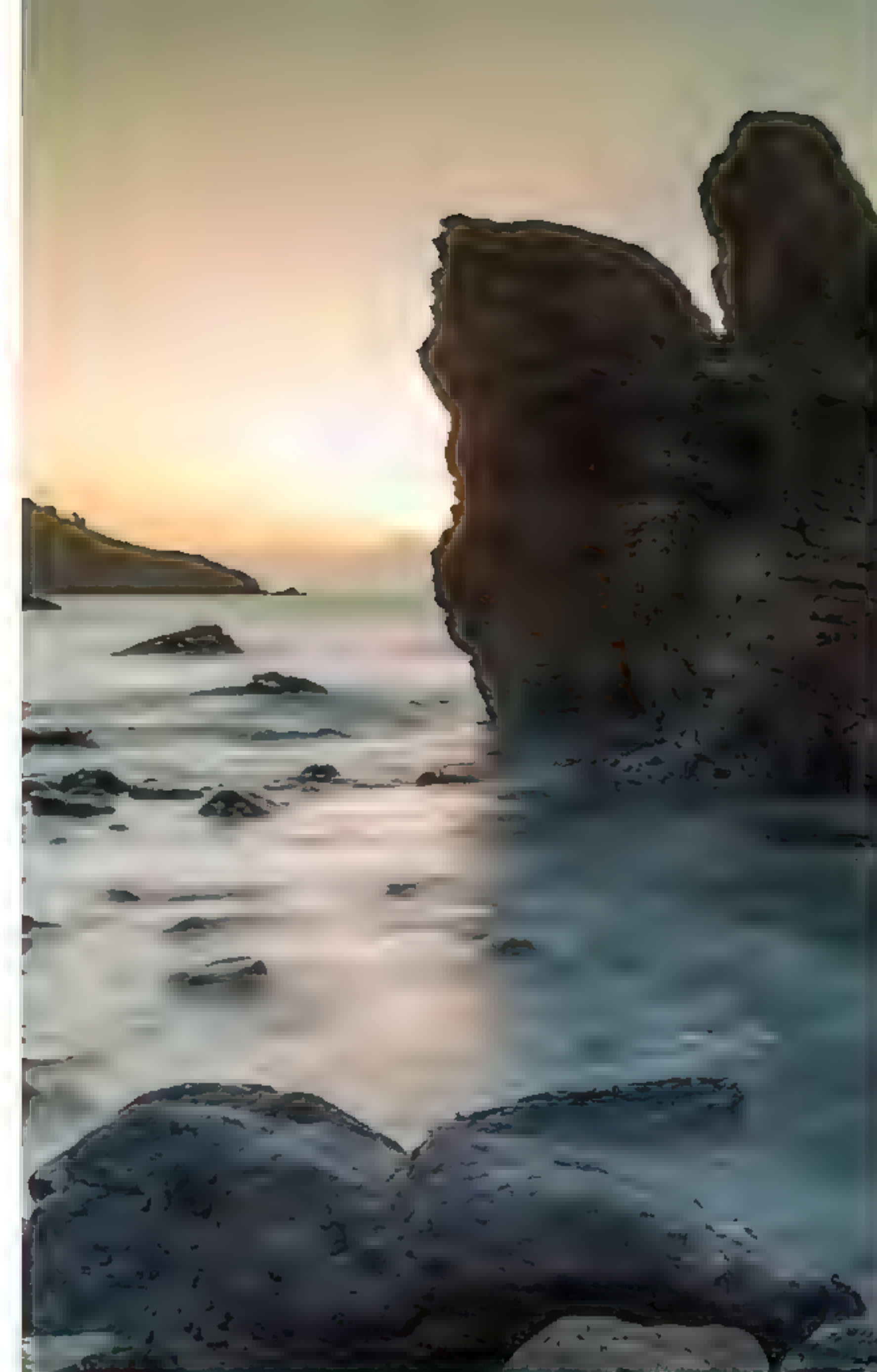
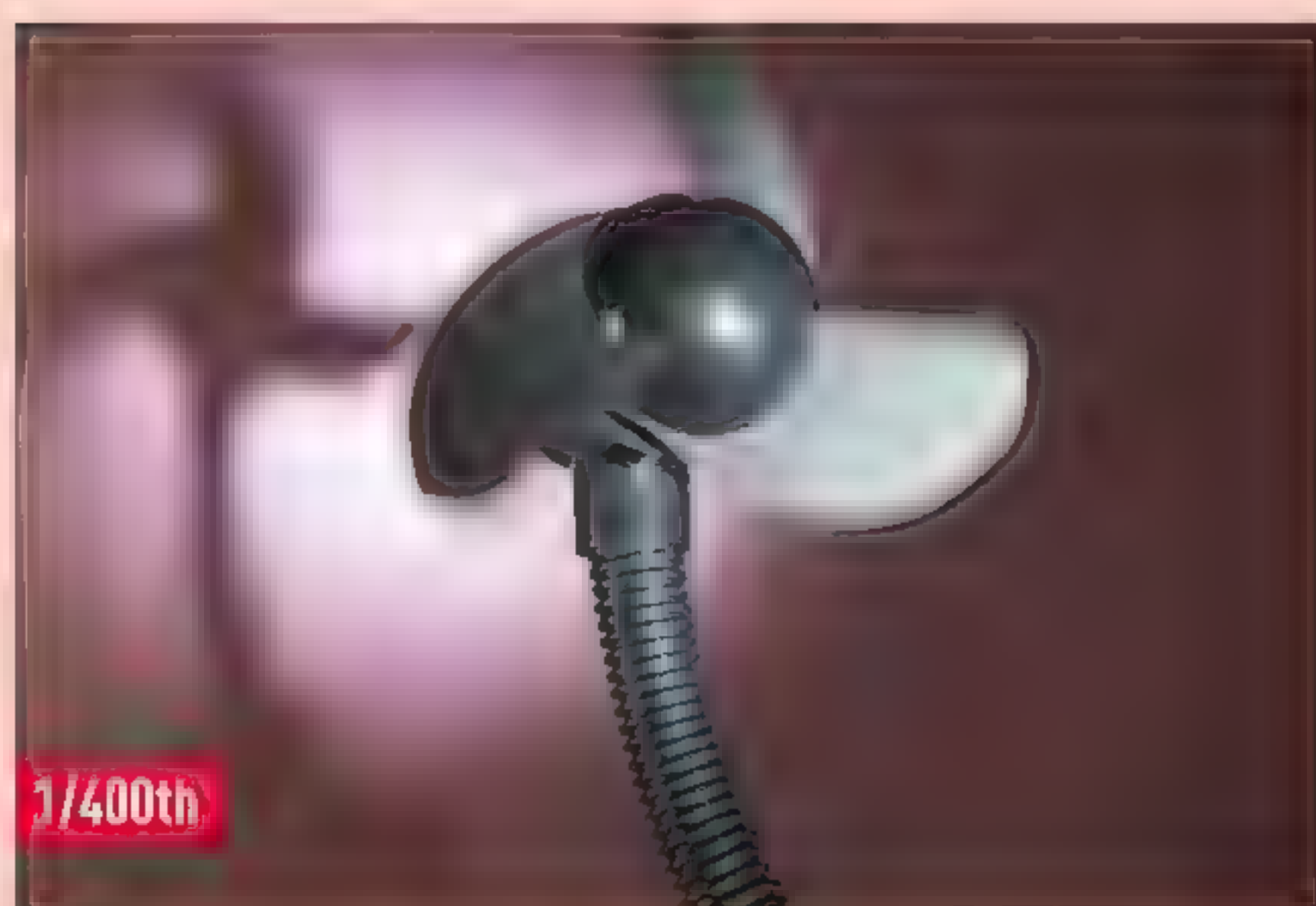
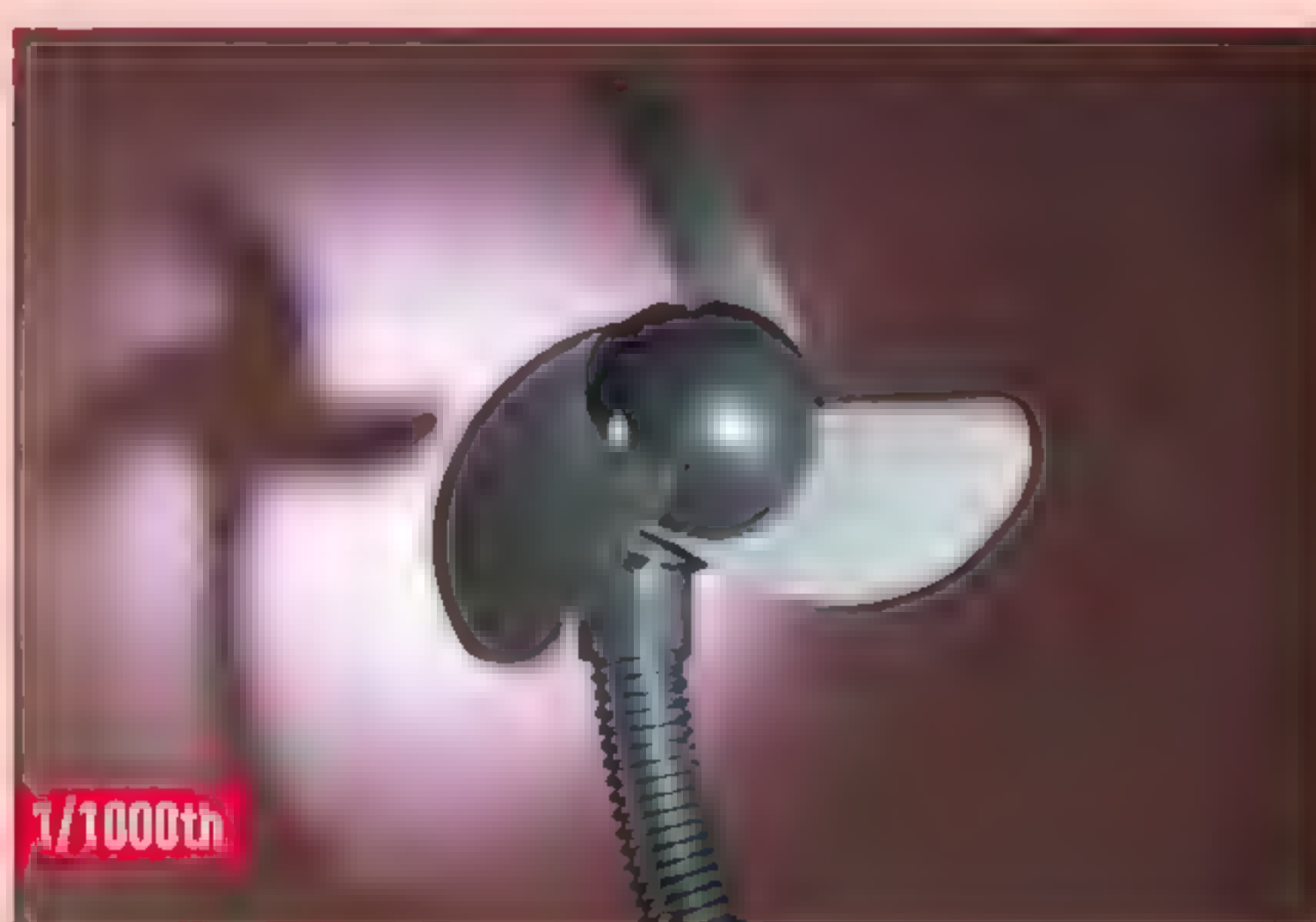
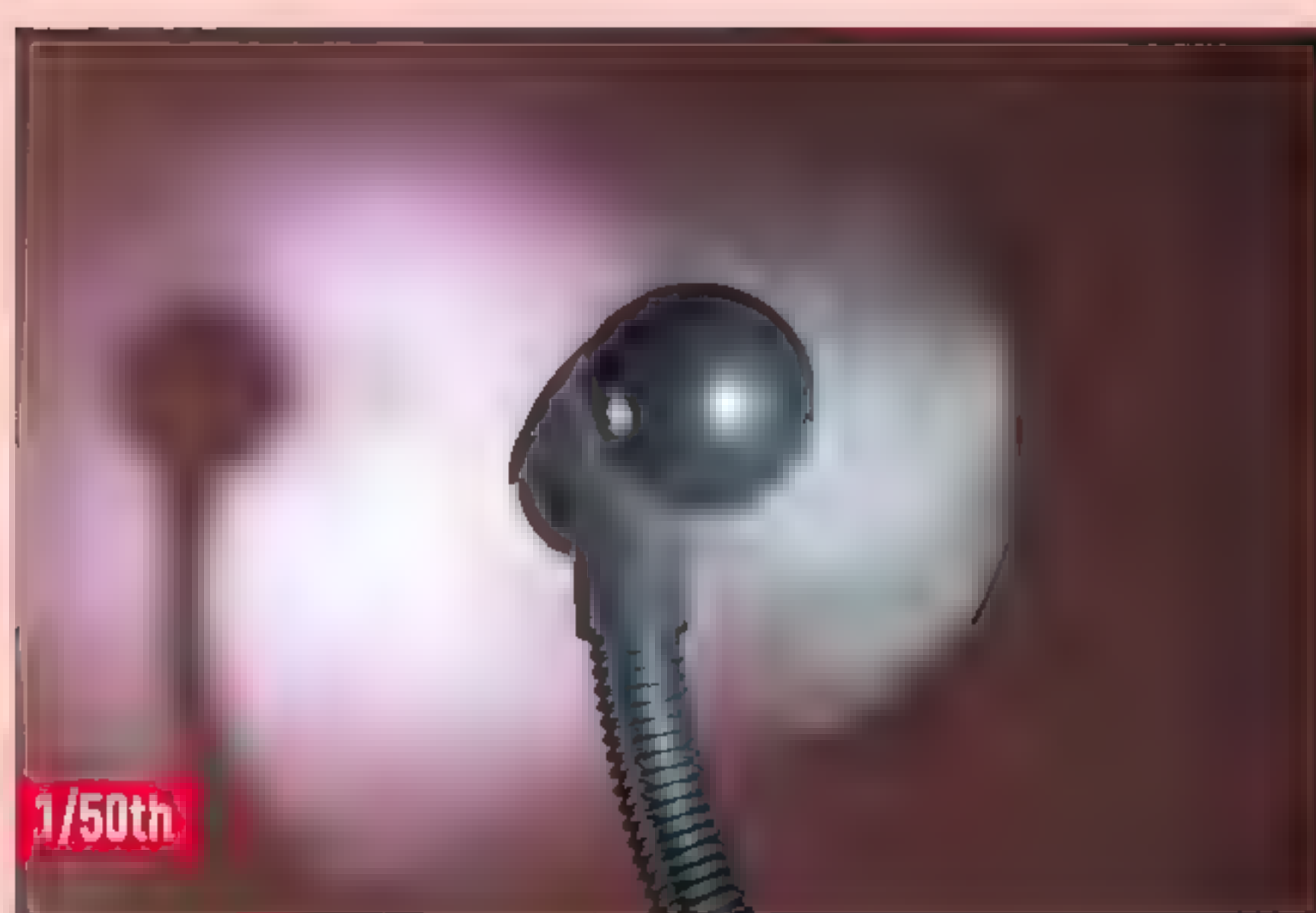
MOTION BLUR

Any movement in the frame during the exposure will be captured in the picture, resulting in motion blur. Anti-shake systems can do nothing to correct this; the only solution is to use a shutter speed fast enough to effectively freeze the action and eliminate any sense of motion. With a fast enough shutter speed

you can freeze even very fast-moving objects, as this next sequence of photos will show. They were taken at shutter speeds ranging from a fairly slow 1/50th of a second up to 1/8000th of a second.

As you can see, at 1/8000th of a second the spinning blades of a desk fan can be frozen in place.

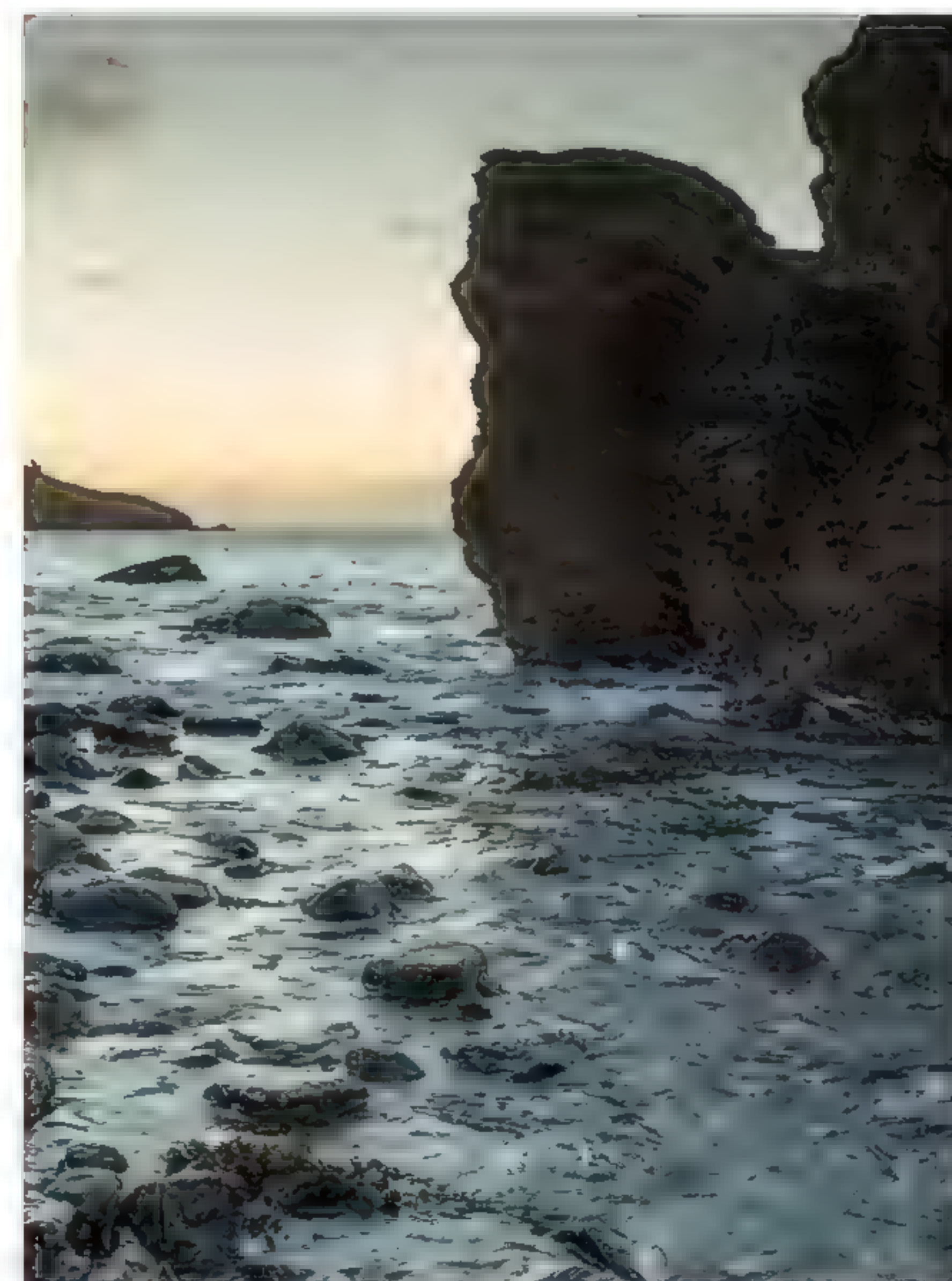
“The solution for motion blur is to use a shutter speed fast enough to freeze the action.”



THE MISTY WATER EFFECT

One of the most effective uses of long shutter speed is photographing flowing water. It's a beautiful if slightly over-used effect, but it is very easy to achieve. Any moving body of water, flowing stream or waterfall will do, as long as it has white splashing water. This scene is Meadfoot beach on the Devon coast.

If you just point the camera and shoot on automatic, you'll end up with something like this (below). It looks nice enough, but it's a bit dull. This example was shot on at a shutter speed of 1/400th of a second and an aperture of f5.6.



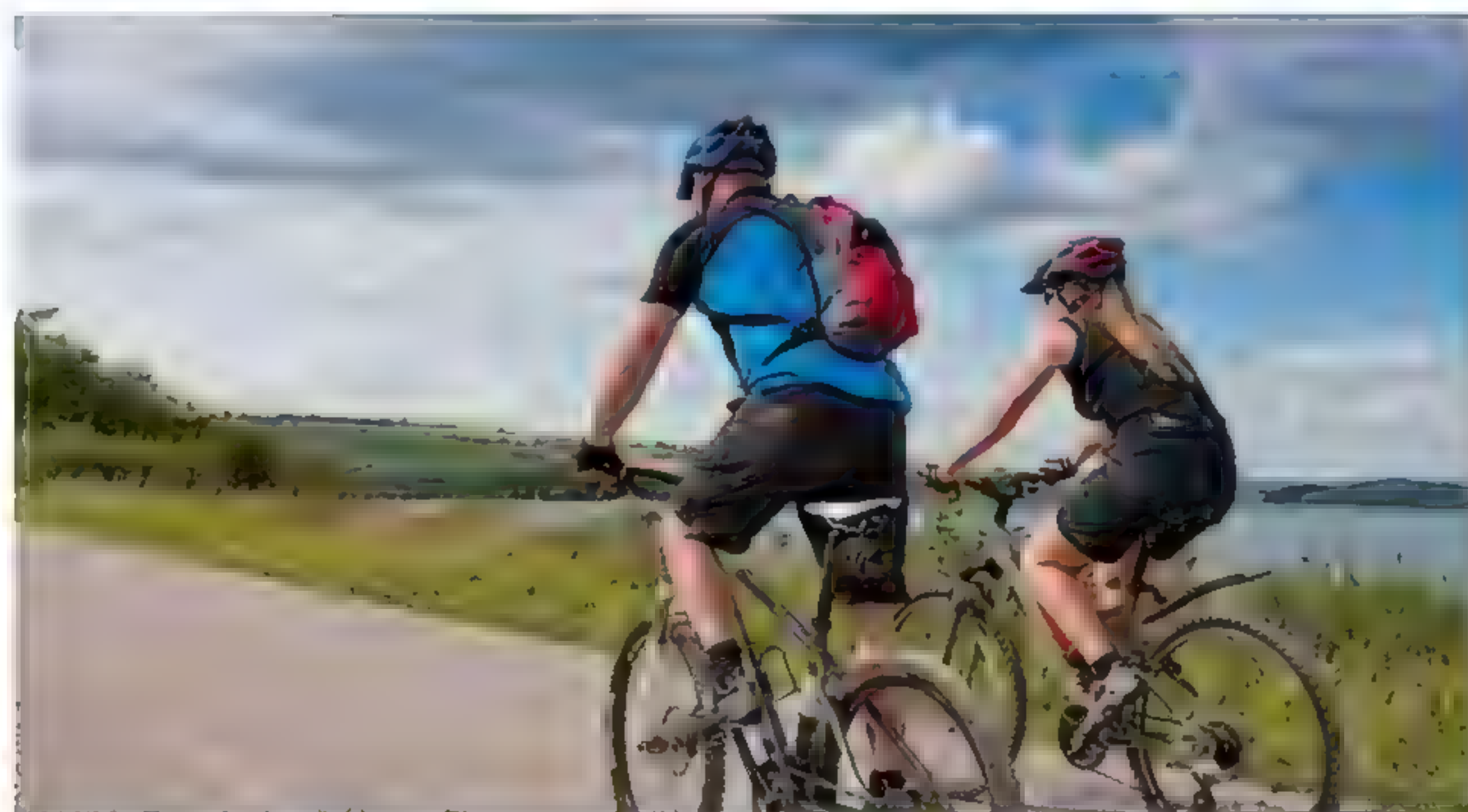
Fixing the camera on a tripod eliminates camera shake. You now need to get the slowest shutter speed you can. The image at the top of the page was taken from the same position as the previous shot, but with the addition of a 2stop ND filter to give a shutter speed of 4 sec and an aperture of f16.

CAPTURING MOVEMENT



Freezing the action with a fast shutter speed produces a nice sharp image, but sometimes you might want to allow a controlled amount of movement blur to show that the subject was in motion. There are a number of ways to accomplish this.

In this first example, the camera was fixed on a tripod, with a shutter speed of $1/250$ th of a second, while the subjects cycled past in front of the lens. The tripod ensures that the background is sharp and the fast shutter speed has frozen the movement. The result is sharp but looks slightly unnatural, as though they were somehow balancing there without moving.



With the camera still mounted on the tripod, the shutter speed was set to $1/10$ th of a second, and another subject came past. This time the background is still sharp, but the slow shutter speed has resulted in lots of movement blur, making the subject almost unrecognisable.



In order to capture the feeling of movement (top image), the best technique is to use a slow shutter speed, but to pan the camera (move it side-to-side) to follow the moving subject as you press the shutter. It is a technique that requires practice, since you need to be able to keep the camera moving smoothly as the exposure is taken, and avoid up-and-down movement as you press the shutter. It may take several tries to get it right, but when it works the results are very effective, with the subject stationary against a movement-blurred background. This shot was taken hand-held at a shutter speed of $1/10$ th of a second. Some recent cameras have a setting on the image stabilisation system to correct vertical movement but not horizontal, which helps with this kind of shot.



CAR LIGHTS AT NIGHT

Another interesting effect achieved using long shutter speeds is streaking car lights at night. The camera was set up on a tripod, using manual focus and full manual exposure, with a cable shutter release. Starting with an aperture of about $f/4$, you will need to dial in your settings to get a balanced exposure. If your exposure duration is still too short, stop your aperture down to $f/5.6$ or smaller until you get a longer exposure duration that renders car lights as long streaks. Generally, a shutter speed of around 4 seconds is a good starting point.

When shooting near heavy traffic at night it's obviously important to stay safe. Wear something bright and reflective, and don't get too close to the road. Also, never use a flash when taking photos of traffic. You could dazzle a driver and cause an accident.



FIREWORKS

One way to take good fireworks photos is to set your camera on a tripod some distance from the display, with the zoom set to a very wide angle. Set a shutter speed of 2 seconds and as wide an aperture as you can manage. Getting the framing exactly right is simply a matter of luck, timing, and then cropping the photo later.

Using a very wide aperture and precise focusing, emphasis can be given to one subject to effectively isolate it from its surroundings.



Aperture and depth of field

With aperture you can control how much of your picture is in focus

Of the three main controls common to nearly all cameras, shutter speed, focus and aperture, it is aperture adjustment that is the least well understood. This is because it not only helps to control exposure, but also affects something called Depth of Field. Understanding the effects of aperture size is a vital skill for any keen photographer.

At least there's nothing mysterious about the name. The aperture is literally a hole through which light passes after it enters the lens. The diameter of this hole can be altered, allowing a greater or smaller amount of light to pass through on its way to the sensor. In the early days of photography, aperture was adjusted by slotting cards with different sized holes cut in them into the body of the camera behind

the lens. These cards were known as 'stops', and this is still part of photographic terminology today. On modern cameras the aperture is controlled by an arrangement of curved shutters inside the body of the lens, which move to produce a continuously variable aperture, however the aperture settings are usually still referred to as 'F-stops'.

Aperture adjustment is used in combination with the shutter speed and ISO sensitivity to control photographic exposure. However it is also the primary means of controlling something called depth of field, a concept that may need a bit of explanation.

If you take a photo of a subject at a distance of about 3 metres with standard zoom lens, in good light with the focal length set to about 30mm, as



“Understanding the effects of aperture size is a vital skill for any keen photographer.”

long as the lens is focused correctly the subject should appear nice and sharp in the image. However you'll usually find that objects about 1.5m in front of the subject, and for about 4 or 5 metres behind the subject, also appear sharp. This distance, from the closest point of acceptable sharpness to the most distant, is known as the depth of field.

By altering the size of the aperture it is possible to control the extent of this depth of field, either reducing it so that only the main subject is in sharp focus, or expanding it so that an entire landscape can appear to be just as sharp.

If you have an older camera to hand, take a look at the lens. It will have a ring for controlling the aperture setting, labelled with numbers usually from about F2 to about F22. The focus control ring will have distances usually calibrated in feet and metres, and alongside it you'll usually find lines marked with the same numbers as the aperture ring, arranged in pairs either side of the focal distance mark with the larger numbers toward the outside. The purpose of this aperture scale is to help estimate the depth of field at a particular distance for any given aperture setting; with the focus set to a particular distance, anything between the two lines for the selected aperture setting should be acceptably sharp. Some older zoom lenses have a series of curved lines etched into the lens barrel for the same purpose. For some reason this scale is missing from most modern auto-focus, auto-aperture lenses, which is a shame because it makes the whole concept of depth of field much easier to understand.



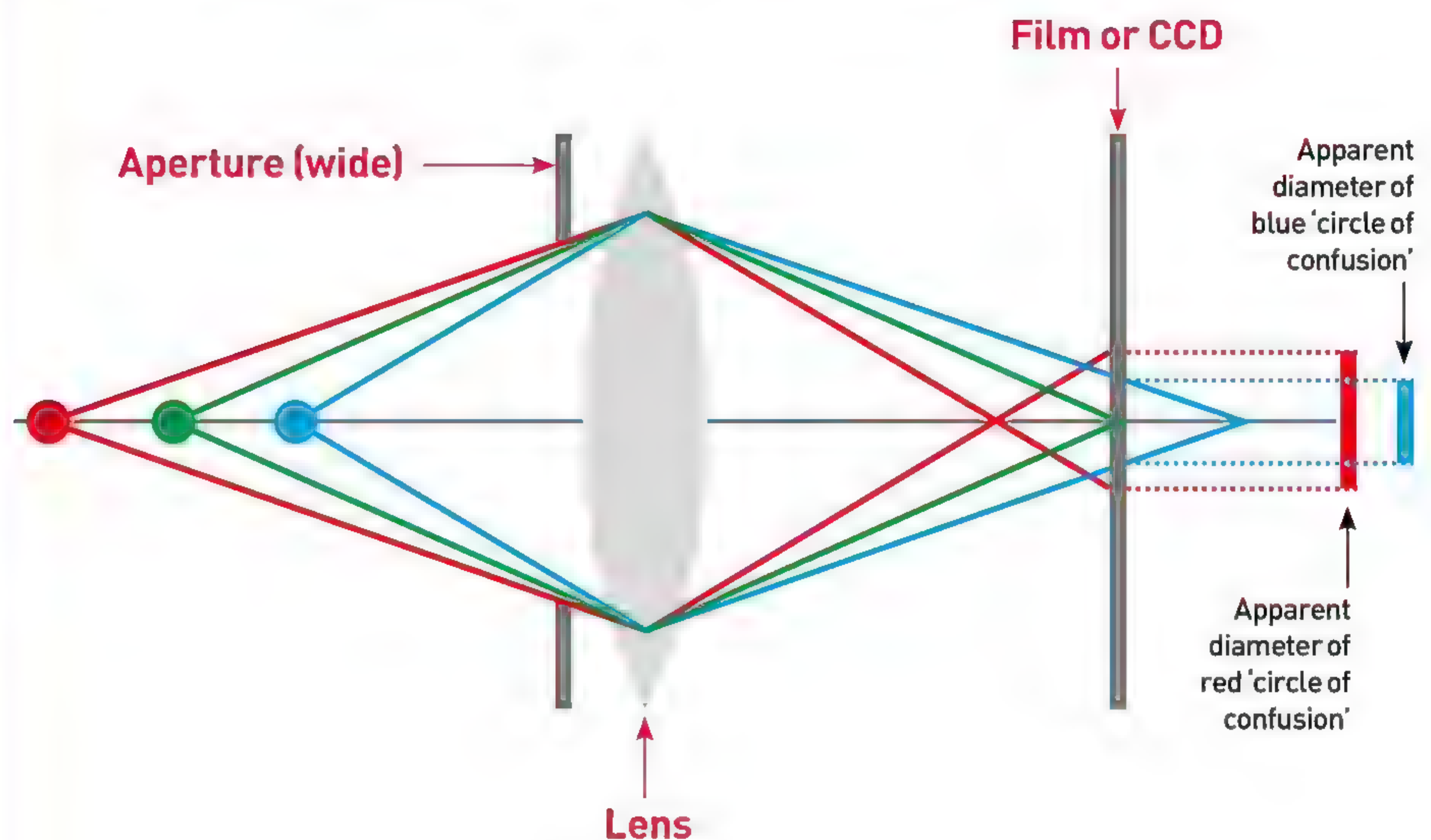
How aperture works

Explaining exactly why altering the size of the lens aperture alters the depth of field is a little complicated, but a few simple diagrams should help to shed some light on the matter. For a start, let's clear up some popular misconceptions about the difference between focus and sharpness.

This is a highly simplified diagram of the arrangement of lens, aperture and sensor inside a modern digital camera. In this first diagram, three subjects at different distances from the camera lens are represented by the red, green and blue dots. The lens is focused on the green spot, so light from it passes through the aperture

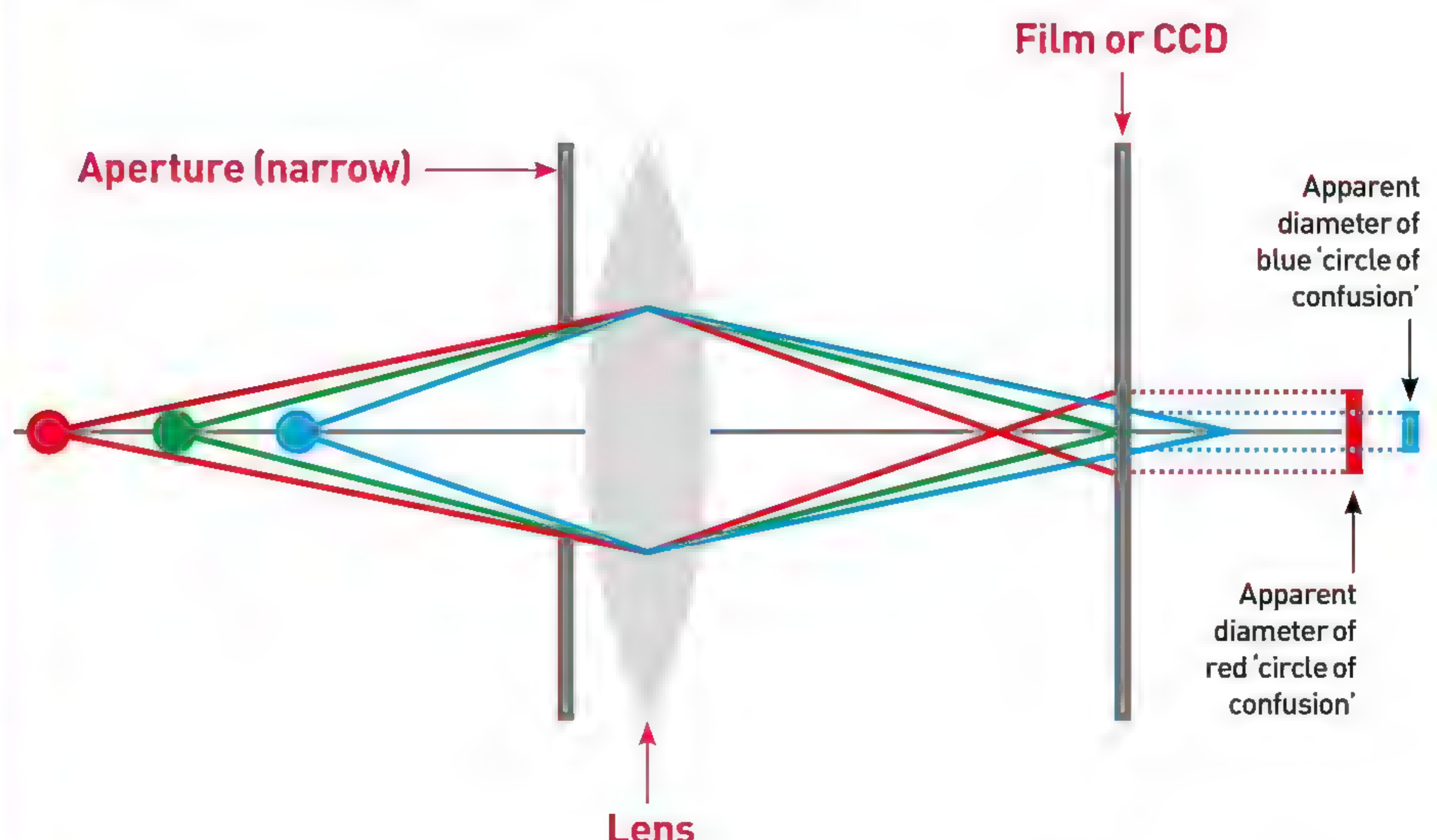
and the lens and appears sharply focused on the sensor. Light from the red and blue spots also passes through the aperture and lens, but light from the red spot focuses a short distance in front of the charged coupled device (CCD), while light from the blue spot focuses a short distance behind it. The light from these other spots still hits the CCD, but due to light scattering it is unfocused and spread over a wide area.

What this means is that the red and blue spots will appear as large blurred spots on the final image, while the green spot will be sharp and in focus. The size of the blurred area of the red and blue spots is called the 'circle of confusion.'



The diagram below shows the same arrangement of camera and subjects, and the coloured spots are the same distance from the lens, but this time the aperture has been reduced to just a small hole. Again the lens is focused on the green spot, and the red and blue spots are out of focus. However the narrow aperture restricts the light scattering and the relative angles of the light

paths, and as a result the 'circles of confusion' are much smaller. This makes the red and blue spots in the final image appear much sharper. They are still out of focus, but the effect is not so noticeable. To make circles of confusion as large as in the first image, the red and blue spots would have to be much further away from the green one.



FOCAL LENGTH AND DEPTH OF FIELD

The focal length of your lens, in other words how much you zoom in on your subject, also has a large effect on depth of field. Short focal lengths have much greater depth of field than longer focal lengths. This is one reason why, when taking a portrait shot, it's a good idea to step back a bit and zoom in rather than using a wide angle lens up close.

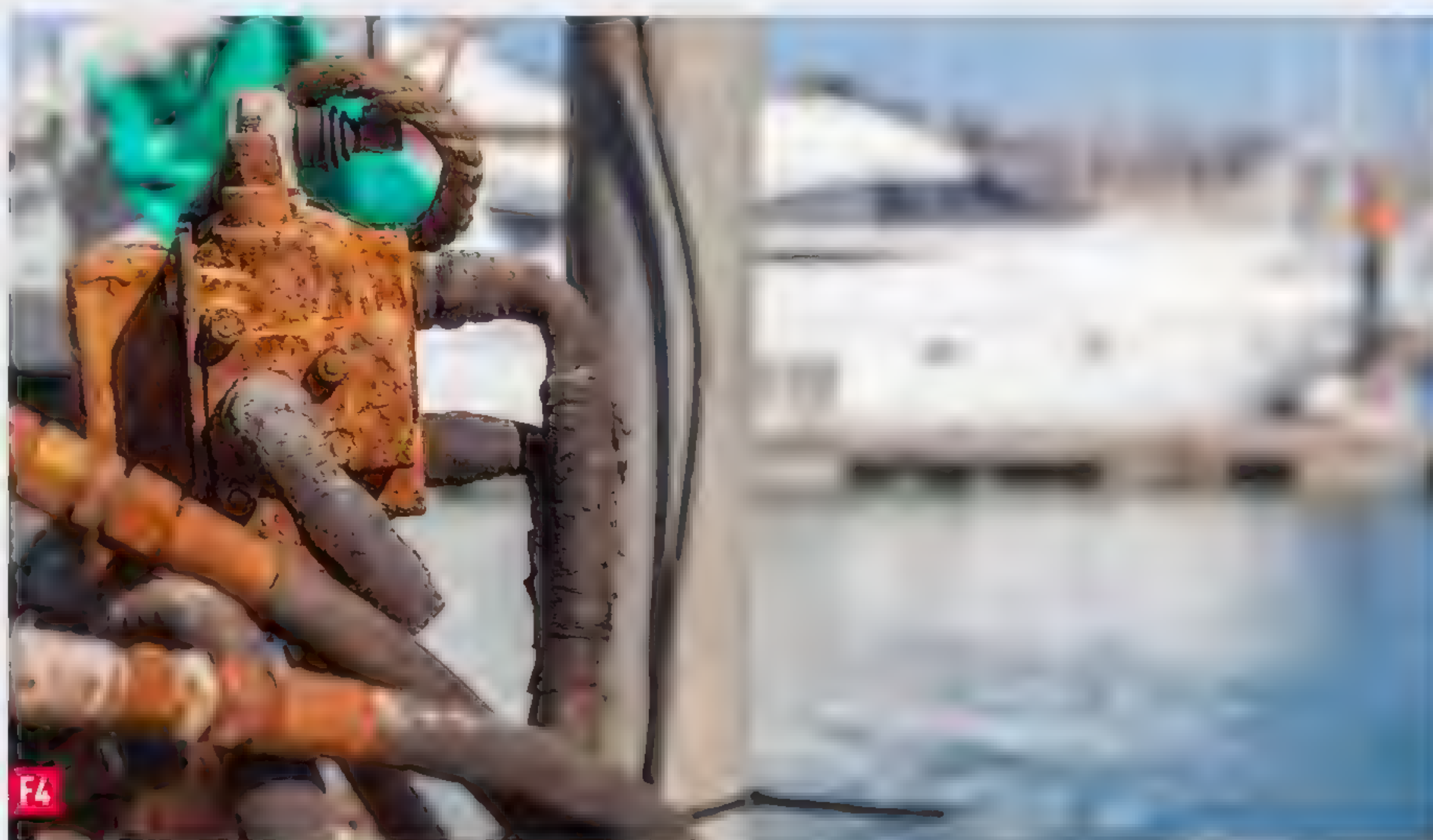
In optics, particularly as it relates to film and photography, depth of field (DOF) is the distance between the nearest and farthest objects in a scene that appear acceptably sharp in an image. Although a lens can precisely focus at only one distance at a time, the decrease in sharpness is gradual on each side of the focused distance, so that within the DOF, the unsharpness is imperceptible under normal viewing conditions.

In some cases, it may be desirable to have the entire image sharp, and a large DOF is appropriate. In other cases, a small DOF may be more effective, emphasizing the subject while de-emphasizing the foreground and background. In cinematography, a large DOF is often called deep focus, and a small DOF is often called shallow focus.

In the examples shown here, at f4, the rusted pump casing nearest the camera on the left is the only object in sharpest focus and the boat in the distance is totally blurred.

At f8 the area of acceptable focus has increased so that some of the foreground pipework and the post behind it are coming into focus and the boat is becoming slightly more defined.

Stopping the camera down to its narrowest aperture of f22 has all the foreground items in focus and the distant boat is now very well defined. In fact, if the lens used was an f/32, it would be completely sharp.



“In optics, particularly as it relates to film and photography, depth of field (DOF) is the distance between the nearest and farthest objects in a scene that appear acceptably sharp in an image.”

Practical uses for depth of field

There are several situations where controlling depth of field is important. The most common is portrait photography. Portraits shot on an automatic camera using a medium aperture usually have a lot of sharp foreground and background detail, which can distract attention away from the main subject.



As you can see in this shot, which was taken using an aperture of $f/16$, the model is in focus, but so is the background, which draws the viewer's attention away from the subject.

By increasing the aperture to $f/4$, and moving the subject further from the background, only the subject is now in sharp focus. A blurred background is much less distracting, and concentrates your attention on the subject, making them really stand out from the background.



LANDSCAPE PHOTOGRAPHY

Another situation in which depth of field is an important issue is landscape photography. Here it is often important to maximise depth of field, so it is usual to use the smallest possible aperture. This shot was

taken using an aperture of $f/16$, to ensure that both the foreground and distant background are in focus. It also uses something called Hyperfocal Distance, which involves a bit of maths to calculate.



Focal length and zoom

Understanding how focal length works in composing shots

Nearly all modern compact cameras have zoom lenses, and most users of digital SLRs or CSCs will also have at least a couple of zooms in their kit. Focal length is one of your primary tools for adjusting composition. Selecting the right focal length for the scene allows the photographer to control perspective, angle of view and

magnification, and can radically alter the mood and style of the photo. Some focal lengths are more suited to particular types of photo, and the properties of wide-angle and telephoto lenses can be used to produce particular effects. Understanding how focal length works and how it affects your photos is a vital photographic skill.

LENSES AND FOCAL LENGTH

“Selecting the right focal length for the scene allows the photographer to control perspective, angle of view and magnification.”

There are basically two types of lens: those with fixed focal lengths, also known as prime lenses; and those with variable focal length, or zoom lenses. They both have their own advantages and disadvantages. Prime lenses are usually smaller and lighter than zooms, and also generally have much faster maximum apertures than a zoom lens at equivalent focal length. The optical quality of prime lenses is also usually a little higher than the equivalent zoom lens. Zoom lenses however are much more convenient, allowing the photographer to cover a wide range of focal lengths with just one or two lenses, rather than carrying around a bulky collection of prime lenses. There are some fast zoom lenses, but they tend to be extremely expensive.

The focal length of a lens is an expression of its magnifying power, and is usually stated in millimetres. If you look on the front of your camera, usually inscribed around the front of the lens you'll find the focal length, or a range of values for zoom lenses. For a typical DSLR kit lens this will usually be around 18-55mm.

For digital cameras it is fairly usual to see two figures quoted, both the actual focal length and the 'equivalent' length. The reason for quoting both is simply that most people are more familiar with the sizes of 35mm lenses, so they know that 28mm is wide angle and suitable for panoramic shots, or that 200mm is a telephoto lens, suitable for long-range subjects.

Real and equivalent focal lengths are different because most digital camera sensors are a lot smaller than a frame of 35mm film, and are fitted much closer to the lens than the film would be. Most consumer DSLRs use the APS-C sensor format. Exact sizes vary from one manufacturer to the next, but are

typically around 22.5 x 15 mm. A frame of 35mm film measures 36 x 24mm, which means that the edges are 1.6x longer, so the focal length of the lens would need to be 1.6x greater to produce the same image size and magnification. This is usually referred to as the 'conversion factor' or 'crop factor'. It means that a typical 18-55mm DSLR zoom lens is roughly equivalent to the popular 28-80mm zoom lens often used on 35mm systems.

Compact camera sensors are even smaller still. Because there are several different sizes of sensor in common use it is more usual for compact camera zoom lenses to be rated in terms of their magnification power, such as 3x, 4x, 10x etc. This relates to the difference between the minimum and maximum focal lengths. A lens with a range of focal length from 5.8mm to 17.4mm is called a 3x zoom, because $17.4 = 3 \times 5.8$.

While in older prime lenses a 200mm lens would literally be 20cm long, modern optical systems use multiple lens elements working in combination, which means that the light path can be shortened while still maintaining the same effective magnification. As a result quite powerful telephoto and zoom lenses can be relatively compact.

Wide-angle and telephoto are relative terms. On a 35mm film SLR a 50mm lens produces approximately the same perspective and magnification as the human eye, and has traditionally been the standard lens for this type of camera.

Anything longer than 50mm is considered a telephoto, while anything shorter is considered wide angle. Digital SLRs tend to follow this rule too, although considering the crop factor the mid-point is approximately 35mm.



300MM TELEPHOTO



50-200MM ZOOM



18-55MM KIT LENS



14MM WIDE-ANGLE

MAGNIFICATION

The most obvious effect of altering focal length is the change in magnification. Anyone who has ever used a zoom lens will be familiar with this effect. If you want to take a photo of something a long way away, you zoom in and the subject appears closer.

This series of photos shows the effect of a wide-angle zoom equivalent to 25mm, medium zoom of 80mm and a telephoto of 400mm, all taken from the same position.

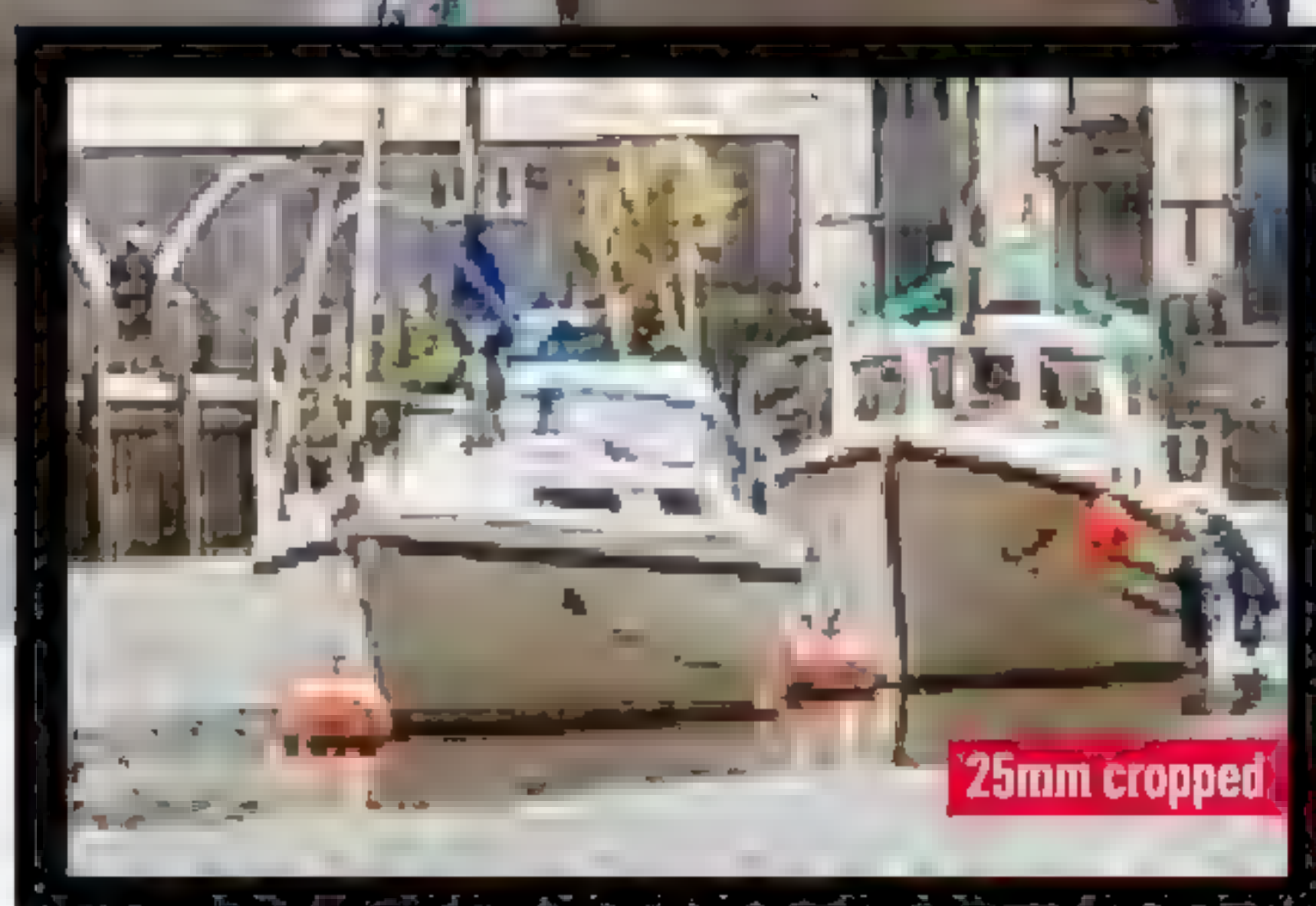
What is happening here is not the subject being

brought closer, but the angle of view being reduced so that a smaller proportion of the scene fills the frame of the sensor. If we look at a cropped-down section of the centre of the wide-angle 25mm view we can see that it looks very similar to the 400mm view, although rather less sharp, because this cropped-down section of the frame obviously has far fewer pixels than the full-frame zoomed-in image. This is the way that digital zoom works on a compact camera, and is why digital zoom should never be used as a substitute for optical zoom.

“A cropped-down section of the frame has far fewer pixels than the full-frame zoomed-in image.”



As you can see, cropping the wide-angle image produces the same effect as zooming in, but greatly reduces quality.



ANGLE OF VIEW

Changing the angle of view can be used to produce some interesting effects. If we move closer to the subject while shortening the focal length we can see that although the subject fills roughly the same area of the final image, in a wide angle shot a lot more of the background is included.

Take a look at this series of five pictures, each one taken at approximately half the focal length of the previous one. As the focal length is reduced more of the background comes into view behind the subject, while objects in the foreground appear much closer to the camera, increasing the appearance of extreme perspective.



PORTRAITS



Changing the angle of view is important to remember when shooting portraits. If you use a short focal length to take a facial portrait at close range the parts that are closest to the camera will appear disproportionately larger, distorting the facial features. The result is an enormous nose, bulbous forehead and tiny ears, not a particularly flattering look (below).

Most portrait photographers prefer to step back a little and zoom in. The most popular choice is a focal length of about 80-100mm, since this gives a flattering, natural-looking perspective (above).



DEPTH OF FIELD

The perspective-flattening of long lenses can also be used in other circumstances, such as drastically reducing depth of field. You can use this to isolate a subject by blurring out the background, as in the shot above (left). Compare this with the same shot on the right, but taken with a wide angle lens from a much closer range. The relative size of the statue is the same in both shots, but due to the increased depth of field in the wide angle shot, the background, although apparently more distant, looks much sharper.



TELEPHOTO LENS

Careful focusing with a long telephoto lens can pick out individual subjects despite busy surroundings, such as focusing on your subject down at the beach with lots of visual distractions. The same scene shot from the same position using a wide angle lens presents the subject, and how they relate to their environment, in a completely different way.

The examples we've used here are extremes intended to emphasise the effects we're demonstrating, but in fact a lot of people only ever use their zoom lenses at either maximum or minimum settings. Don't do this out of habit; instead use the full range of the lens to explore all the different possibilities it offers. Focal length is one of your primary creative tools, so make good use of it.

White balance

White may not be as white as you think

When you look at, for example, a sheet of white paper, your brain adjusts what you see so that it matches what you are expecting to see. However your digital camera doesn't have any expectations, and the colour that it "sees" is the actual colour present in the scene.

'White' light visible to humans can actually vary in colour from reddish orange to greenish-blue. This variation is usually described as a temperature range, with warm being the red end and cold at the blue end, and is usually measured in degrees Kelvin using a colour meter. Confusingly, the higher the colour temperature, the cooler the tone and vice versa.

We perceive various shades of white light illuminating a scene as neutral, a clever trick performed by our brains to maintain a sense of normality. Digital cameras can perform the same trick using a feature called automatic white balance. The camera evaluates the scene through the lens, analysing areas it guesses should be white (highlights) and black (shadows). More expensive cameras have a more reliable ambient white balance sensor that measures the temperature of general, focused light. However these automatic systems can be fooled, so most cameras give you the option of setting the white balance manually, either from pre-sets that cover most normal lighting conditions or by making an accurate measurement of the prevailing lighting conditions.

In the example pictures on this page you'll see an image with ordinary incandescent light bulbs, also called tungsten lighting. As you can see, when the camera is set to the warm artificial light white balance setting that suits this lighting, the light areas of the scene are neutral. The same scene looks very different when the camera's white balance is set to normal daylight colour temperature. Now there is a distinct reddish-orange cast. Light bulbs can shine with various colour temperatures. Cheap traditional, low wattage light bulbs tend to be the warmest in colour, while low voltage halogen bulbs are cooler in tone.

Another example is a typical noon day outdoor scene where the ambient white light temperature is cool. When the camera's white balance setting matches the cool tone of the brightness of the sun, everything looks quite normal. On the other hand, if the camera has been set for tungsten artificial light, the scene appears to have a very



INCANDESCENT, WITH DAYLIGHT WHITE BALANCE



INCANDESCENT LIGHT, INCANDESCENT WHITE BALANCE



DAYLIGHT, WITH DAYLIGHT WHITE BALANCE



DAYLIGHT, INCANDESCENT WHITE BALANCE

blue cast. Sunlight, like artificial light, can vary quite considerably in colour temperature. Early morning and late afternoon daylight is warmer as cooler components of the light are filtered out because it has to shine through more atmosphere and its pollutants as the sun is nearer the horizon. Meanwhile, cloudy and overcast conditions deliver a cooler light because warmer components are filtered out by the cloud.

Our third example is lit with fluorescent lighting, and presents an even harder challenge for your digital camera. The visible spectrum of fluorescent light is not a nice smooth line, it's full of peaks and troughs. Some fluorescent lights have a green cast and others a pink cast. These differences are visibly evident where strip lights of different tone have been fitted side by side. So-called daylight tone fluorescent lights are not equivalent to real daylight. Better digital cameras will have a number of pre-sets for fluorescent light to help you match the white balance in these conditions more accurately. In our example here, the fluorescent light is a greenish yellow in tone.

Know your camera

Nearly all digital cameras offer white balance adjustments accessible either from a settings menu or, typically on higher spec cameras, via an external button in conjunction with an LCD display.

Manual white balance

Some cameras can let you calibrate the white balance setting manually. You simply hold a white card in front of the camera lens and press a white balance calibration button. The camera adjusts its white balance setting until the card is reproduced neutrally. Beware of this setting remaining on as when you return to normal shooting conditions it may spoil your pictures!

Pre-set white balance

All digital cameras offer choice of white balance pre-sets, and some cameras let you choose the setting via colour temperature values. Some really advanced cameras let you bracket white balance settings, or take a series of shots with settings above and below your standard setting. ■

“We perceive various shades of white light illuminating a scene as neutral, a trick performed by our brains to maintain a sense of normality.”



TYPICAL WHITE BALANCE VALUES

TUNGSTEN/ARTIFICIAL

2500-3000K



FLUORESCENT

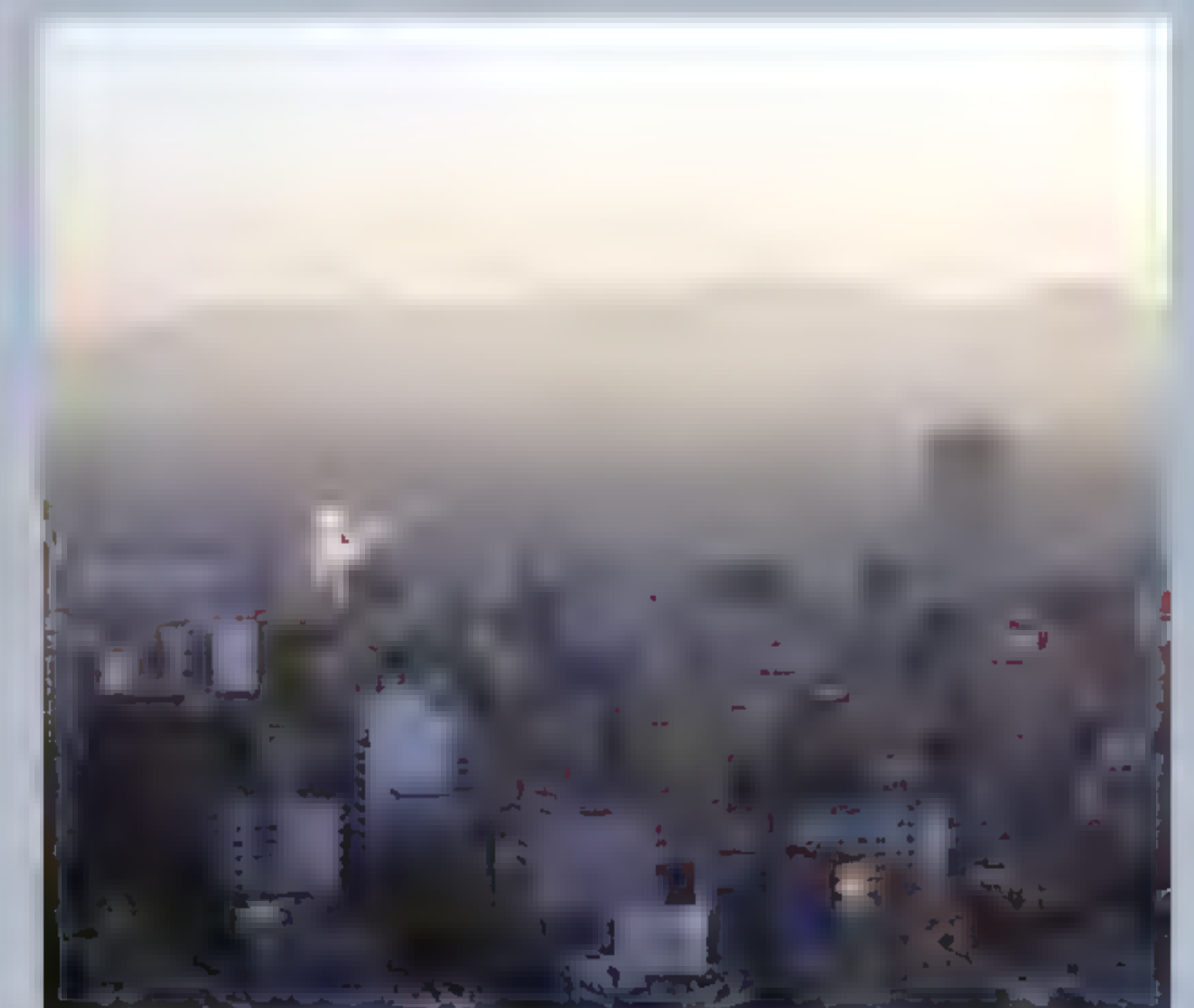
3500-5500K

NORMAL DAYLIGHT

5500-6000K

CLOUDY/OVERCAST

6000-8000K



CLEAR BLUE SKY

10,000-15,000K



Shooting modes

Choosing the best setting for the correct shooting conditions

All but the most basic budget compact cameras have a selection of shooting modes, usually chosen by a dial on the top or back of the camera. Easy-to-use, mainly automatic cameras in the range will only have a few shooting modes, while the more sophisticated cameras such as the DSLR may have as many as a dozen, including manual exposure options and user-programmable special settings.

As newer models appear in the range or older models are updated, the shooting modes available will be revised and possibly expanded. Shown on this spread are some of the most often used modes selected from the mode dial on the top of the camera and in some cases, from the menu screen on the back of the camera. ■

Auto DOF Mode: As you focus on your subject, the camera will use the other focus points to measure the distance of the other objects in the viewfinder. It will determine what the appropriate aperture setting should be to render everything in focus.



Bulb Mode: Lets you control both shutter speed and lens aperture independently. Many cameras offer a Bulb shutter, allowing long exposures for as long as you hold the shutter button down. In some cameras, Bulb mode can be set from the command dial or through the menu screen.



Manual Exposure: This mode provides the same range of exposure control as the other shooting modes, but lets you control both shutter speed and lens aperture independently for more creative control.



Aperture-Priority AE: This allows you to set the lens aperture, while the camera is left to select the most appropriate shutter speed. You have control over all the other exposure variables, including the control of exposure compensation.



Full Automatic Mode: Full Automatic is indicated on the Mode dial by a green rectangular outline. In this mode, the camera makes all exposure decisions with the exception of image quality. Autofocus mode is set to AI Focus.



Close-up Mode (Macro Mode): Turning the Mode dial to the macro flower symbol sets the camera for capturing smaller subjects such as flowers, jewellery, and other small details. The autofocus mode is automatically adjusted to One Shot.



Shutter-Priority AE: You can manually set the shutter speed you want to work with, while the camera chooses the best corresponding aperture setting. You have control over all other exposure variables, including exposure compensation.



Flash Off Mode: Flash Off mode disables both the internal flash head and any external flash unit connected. Focus is set to AI Focus mode, the AF assist lamp disabled. ISO and white balance are set automatically as well.



Sports Mode: This mode uses a faster shutter speed to capture fast-moving subjects. The autofocus mode is automatically set to AI Servo to predictively track your subject and keep it in focus as it moves.



Creative Auto Mode: When set to CA mode, the camera allows the user to adjust picture style, motor drive, and exposure compensation, as well as to use the program shift function.



Portrait Mode: This mode uses a large aperture setting to decrease the depth of field, which blurs the background to emphasize the subject. ISO and white balance are set to Auto.



Night Portrait Mode: This mode is for taking pictures of people at sunset or at night, letting the flash illuminate the subject, while the longer exposure provides a brighter view of the surroundings.



Program AE: Similar to the Full Automatic mode, but allows more control over the exposure variables. Aperture and shutter speed are automatically selected by the camera, but you can alter exposure to different apertures by turning the Main dial.



Landscape Mode: Landscape mode combines slower shutter speeds with smaller aperture settings to increase the depth of field when shooting broad panoramas and sweeping landscapes.



Movie Mode: When Movie mode is selected, the camera's mirror and shutter open, as in Live View mode, but the Live View / Movie button on the camera's back functions as the start/stop button for movie recording.





File types and image compression

How is it possible to store so many images on such a tiny memory card?

File compression uses complex mathematical algorithms to squeeze big image files into small spaces, but quality can suffer.

If you've had a computer or a digital camera for more than a couple of days, you'll have come across JPEG images, usually denoted by the file extension '.jpg', and you may be wondering exactly what it means. The letters themselves stand for the Joint Photographic Expert Group, a body of scientists, programmers and engineers from the imaging industry who got together several years ago to come up with a new standard for file storage that would allow images from different computer programs to be interchangeable, so that a picture from one computer could be viewed on another without having to use file conversion programs.

The JPEG standard also happens to be an ideal format for storing pictures on a digital camera, because it uses something called file compression. This is a technique that allows a large number of images to be stored in a relatively small amount of memory by squashing the files so they take up less room. For this reason JPEG has become the standard image file format for all digital cameras.

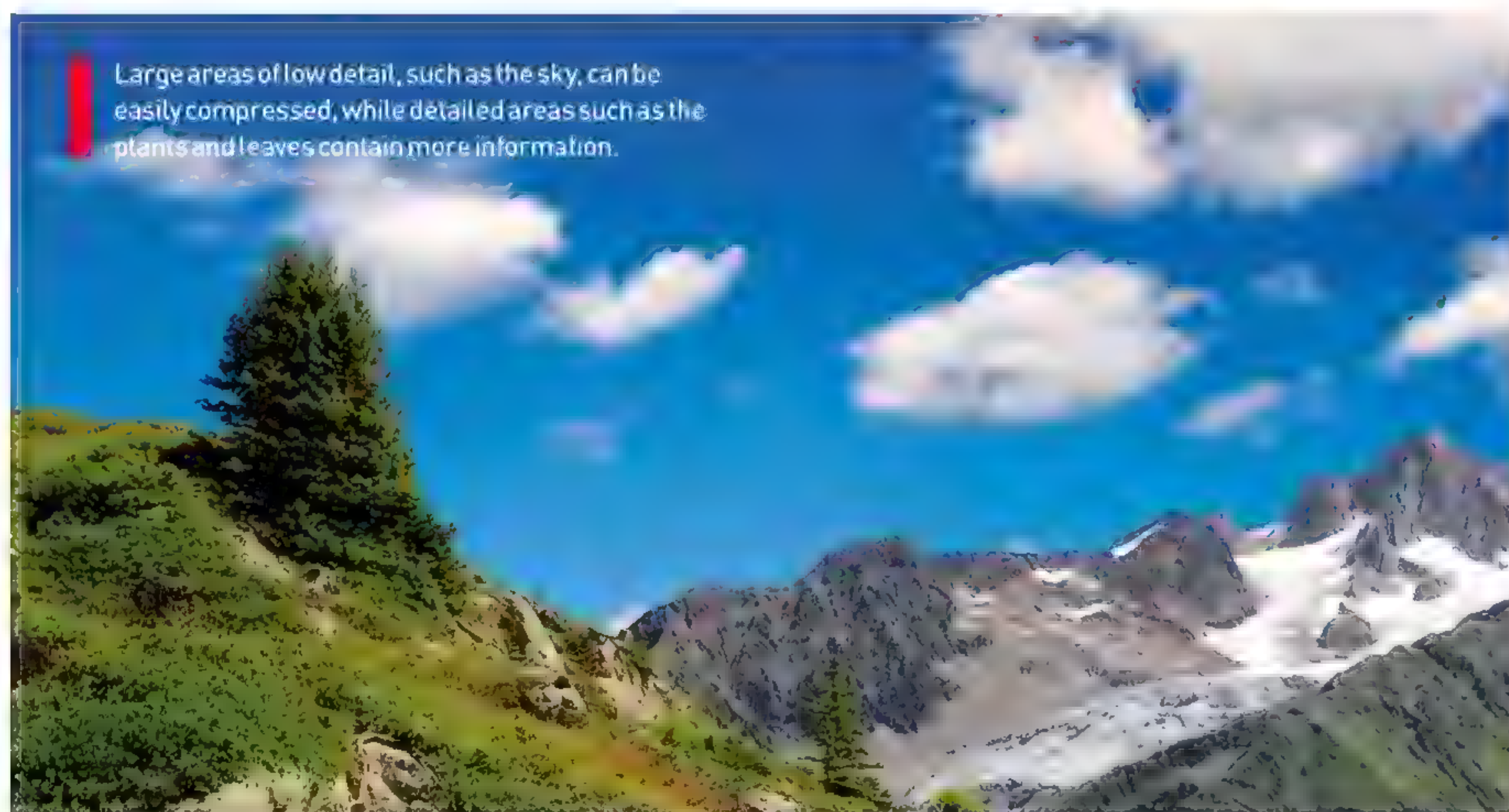
A full technical explanation of file compression would fill a decent-sized textbook. It uses complex mathematical techniques that you simply don't need to know unless you're a software engineer working on a new digital camera. As consumers, all we need

to know is that it reduces the size of the picture file by reducing the amount of information stored in it. JPEG compression reduces file size by reducing picture quality, and for this reason it is called 'lossy' storage. For most purposes this quality reduction is imperceptible and fine for day-to-day use, but for maximum image quality there are other types of image file which are uncompressed and lose no quality, the most common one being TIFF, which stands for 'Tagged Image File Format'.

Basically, the way JPEG compression works is like this. An average digital photograph contains varying levels of detail. For example, take an average holiday snap of a family on a



“For maximum image quality there are other types of image file which are uncompressed and lose no quality, the most common being TIFF.”



beach. While the main subject, the people in the foreground, contains a lot of detail, there will also be large areas such as the sky, the sand and the sea, which contain relatively little detail. In order to reduce the size of the file, some data from the lower detail areas can safely be lost without affecting the quality of the picture too much. The way this is done is usually by reducing the number of tonal variations between areas of similar colour, so you may notice artefacts that look like squares or stripes in highly compressed images.

Whatever make or model of digital camera you have, it will almost certainly have an option in the menu that allows you to select

image quality. What this option is doing is setting the level of file compression. If you select the lowest quality, you will probably find that you can fit about four times as many images onto your memory card as you can at the highest setting, because the higher JPEG compression setting makes the files one quarter as big, but reduces the quality of the picture to compensate. Most people will use the highest setting most of the time, but unless you intend to print all your pictures at the largest size possible, you really can get away with using a lower quality setting and still have pictures to be proud of, plus you'll be able to take twice as many. ■

COMPRESSION SETTINGS

Even shooting at your camera's lowest quality setting will still produce acceptable results under most circumstances. These three photos were taken using a relatively cheap digital compact camera (a Casio Exilim EX-S12) using the Economy, Normal and Fine quality settings. As you can see the differences are very hard to spot.

garden become	compressed air n. air at more than atmospheric pressure.
ness. syrup.	compression n. 1 the act of compressing being compressed. 2 the reduction in volume (causing an increase in pressure) of the mixture in an internal-combustion engine before ignition.
ture of NORMAL formed	compressor n. an instrument or device compressing, esp. a machine used for increasing the pressure of air or other gases.
garden become	compressed air n. air at more than atmospheric pressure.
ness. syrup.	compression n. 1 the act of compressing being compressed. 2 the reduction in volume (causing an increase in pressure) of the mixture in an internal-combustion engine before ignition.
ture of FINE formed	compressor n. an instrument or device compressing, esp. a machine used for increasing the pressure of air or other gases.
garden become	compressed air n. air at more than atmospheric pressure.
ness. syrup.	compression n. 1 the act of compressing being compressed. 2 the reduction in volume (causing an increase in pressure) of the mixture in an internal-combustion engine before ignition.
ture of ECONOMY formed	compressor n. an instrument or device compressing, esp. a machine used for increasing the pressure of air or other gases.

The next picture is the same Economy mode shot as above, but resaved as a JPEG using Adobe Photoshop using the highest compression setting. While the quality is certainly lower the image is far from useless.

garden become	compressed air n. air at more than atmospheric pressure.
ness. syrup.	compression n. 1 the act of compressing being compressed. 2 the reduction in volume (causing an increase in pressure) of the mixture in an internal-combustion engine before ignition.
ture of ECONOMY MODE RESAVED AS JPEG formed	compressor n. an instrument or device compressing, esp. a machine used for increasing the pressure of air or other gases.

For comparison, this next shot was taken using a 10-megapixel Digital SLR in raw mode, then converted to a low-compression JPEG using Adobe Photoshop. The quality is certainly better, but it's not *that* much better.

garden become	compressed air n. air at more than atmospheric pressure.
ness. syrup.	compression n. 1 the act of compressing being compressed. 2 the reduction in volume (causing an increase in pressure) of the mixture in an internal-combustion engine before ignition.
ture of com- or more formed	compressor n. an instrument or device compressing, esp. a machine used for increasing the pressure of air or other gases.

CREATIVE PROJECTS

Learn the creative techniques that the professionals use

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102 - 105 Oil - image (165)

Now you're familiar with how your camera works and how to use its many features, you're ready to start learning the creative techniques that professional photographers use to achieve great results time after time. By learning and using a few simple techniques you can turn your photographs from well-taken snapshots into works of art of which you can be proud.

Professional photographers use some very simple tricks and rules-of-thumb that have been developed over many years, including rules of composition that are inspired by classical art. Combined with technical skill and a thorough understanding of the principles of photography that we laid

out in the previous section, these artistic methods produce well-balanced, attractive photographs that will really stand out. However the true artistic inspiration that differentiates a talented photographer from merely a skilled technician must come from within, and can't be taught by any guide book, but we hope you will step out and make your mark.

There are of course many more secrets and tricks in the field of creative photography than we have room to cover in this general guide to photography, but hopefully we can show you some basic principles that will form the foundation of your hobby and inspire you to learn more. If we succeed in that aim, then our job here is done! ■

“By learning and using a few simple techniques you can turn your photographs from well-taken snapshots into works of art of which you can be proud.”



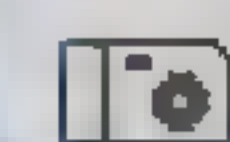
Forced perspective and optical illusion

A fun method of messing with people's perception

$f/22.0$ $1/250$



-0.33



ISO 500

At lower angles, both characters can appear to be standing at the same ground level. This watering can illusion works well because of that simple technique.

Forced perspective is a form of optical illusion where you can make objects appear larger or smaller than they really are in relation to each other. If you've ever seen Lord of the Rings, there is a scene where Frodo and Gandalf are sitting opposite each other at a table. In reality, the actor playing Frodo was much further away from the camera and the set was cleverly built so the tabletop merged seamlessly once the camera was in the right position, and with both actors staring at a preset point, it made it look like they were looking at each other even though they were several metres apart. Doubtless you've seen many photographs of people on holiday, pretending to prop up the Leaning Tower of Pisa. This is the kind of illusion where two objects seem to interact, even though they are quite a distance apart.

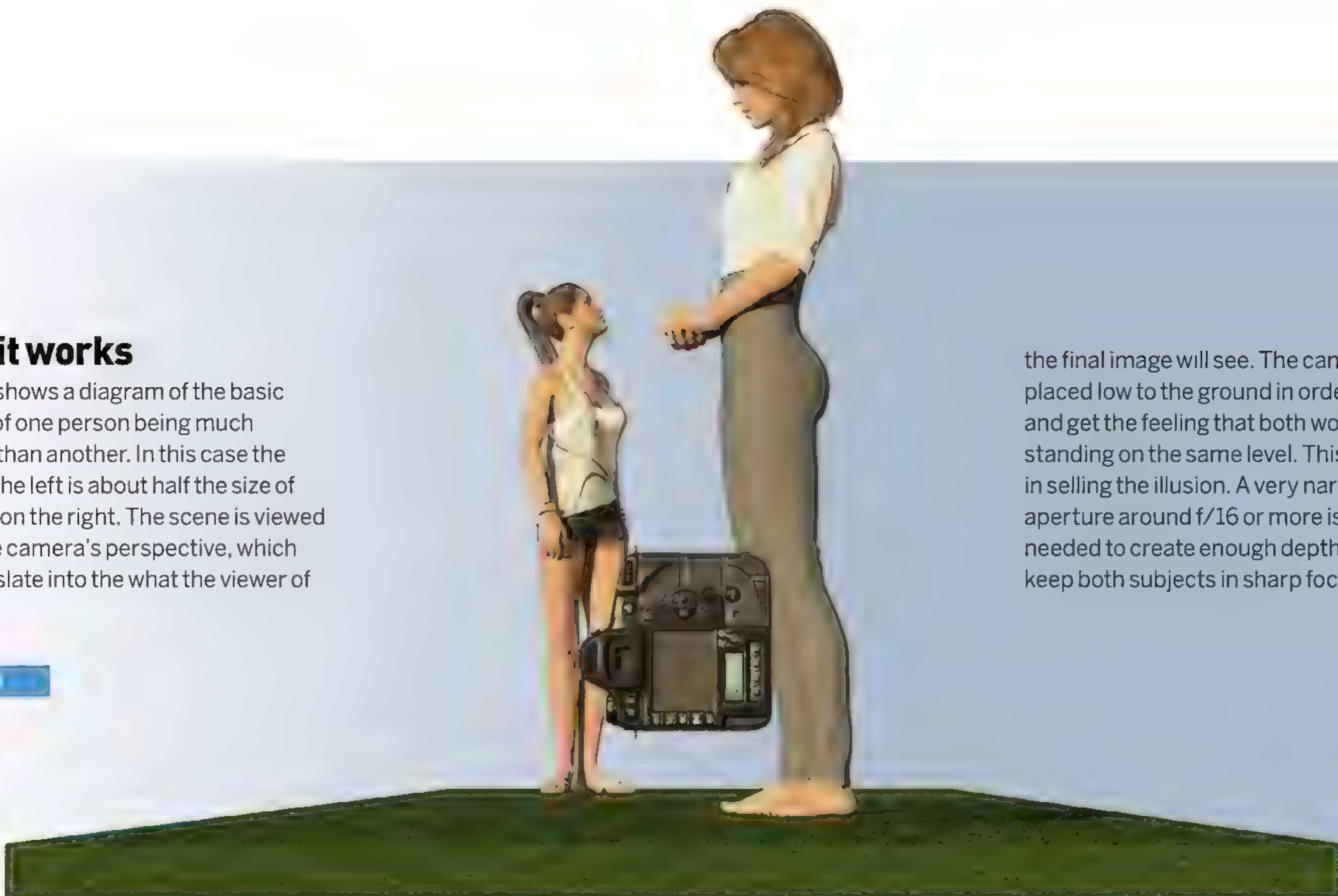


How it works

Fig. 1 shows a diagram of the basic illusion of one person being much smaller than another. In this case the lady on the left is about half the size of the lady on the right. The scene is viewed from the camera's perspective, which will translate into the what the viewer of

the final image will see. The camera is placed low to the ground in order to try and get the feeling that both women are standing on the same level. This is helpful in selling the illusion. A very narrow aperture around f/16 or more is also needed to create enough depth of field to keep both subjects in sharp focus.

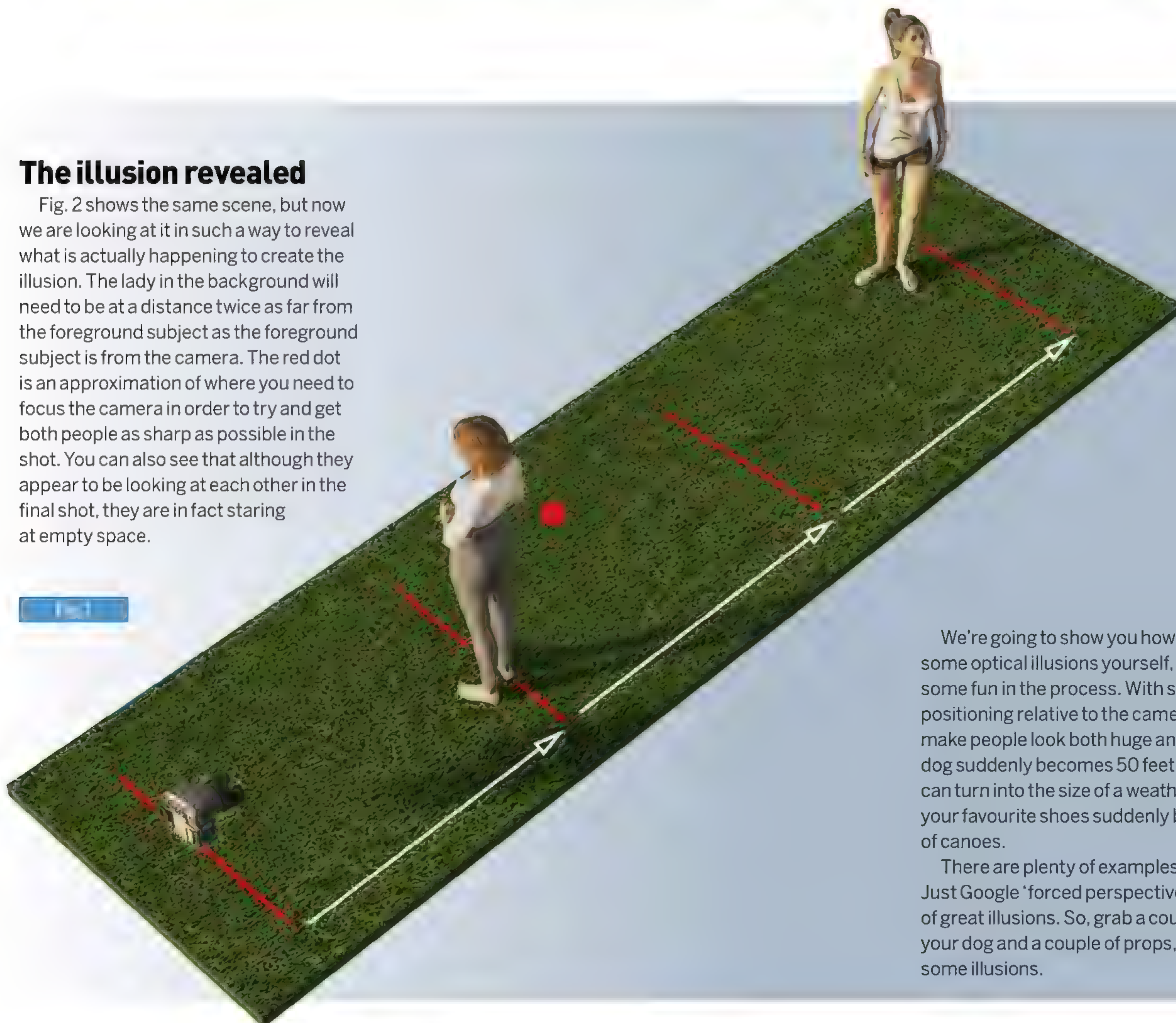
Fig. 1



The illusion revealed

Fig. 2 shows the same scene, but now we are looking at it in such a way to reveal what is actually happening to create the illusion. The lady in the background will need to be at a distance twice as far from the foreground subject as the foreground subject is from the camera. The red dot is an approximation of where you need to focus the camera in order to try and get both people as sharp as possible in the shot. You can also see that although they appear to be looking at each other in the final shot, they are in fact staring at empty space.

Fig. 2



We're going to show you how you can achieve some optical illusions yourself, and have some fun in the process. With some simple positioning relative to the camera, you can make people look both huge and tiny, and your dog suddenly becomes 50 feet tall. A football can turn into the size of a weather balloon, and your favourite shoes suddenly become the size of canoes.

There are plenty of examples to be found. Just Google 'forced perspective' to see lots of great illusions. So, grab a couple of friends, your dog and a couple of props, and let's create some illusions.



"Sitting the wrong way up is a very simple illusion. Widely copied, it takes a common object that we interact with and turns it on its side."

Another variation of the illusion of sitting the wrong way up. Here you lie with your back on the pavement and your feet resting against what is actually a vertical surface. The inclusion of background details also helps exaggerate the strangeness of what you are seeing.

Apart from the park bench illusion (left) all the illusions were created with a Canon 5DMK2 and a 16-35mm f/2.8 wide-angle lens using an aperture around f/22 for maximum depth of field.



Cameraphones can be used to great effect to create these forced perspective images. They can be capable of large depth of field, which is ideal for these situations.

What do I need?

A camera and a decent wide-angle lens is your preferred gear of choice. You may have two objects far apart but you want as much depth of field as possible to have them both in focus. A wide-angle lens will let you do this. You'll also want as narrow an aperture setting as possible, whilst keeping a reasonable shutter speed, to avoid camera shake. A bright sunny day is ideal to make sure you can achieve all this. Although they may not have as wide an angle of view as a DSLR's wide-angle lens, many people have used their cameraphones to great effect as they are capable of quite a large depth of field, ideal for these situations.

Cliffside park bench

Sitting the wrong way up is a very simple illusion. Widely copied, it takes a common object that we interact with and turns it on its side. You'll need a willing subject and a good old park bench. Get your subject to sit the wrong way around on the bench with their legs dangling over the back of the upright backrest and their back on the seat. They'll need to hold their body and legs in such a way that mimics a normal seated position in this rotated orientation. You then shoot the scene in landscape orientation, perhaps having a few references in the background to show it in situ. Then, when you process the final image, just

rotate it 90° and it now looks like your subject is suddenly sitting on a bench that is fixed to a vertical cliff face.

Land of the giants

This illusion is slightly more involved. You'll need two subjects. One is placed just in front of your camera, and the other that we want to appear small is placed much further away until they are at a size that suits your image. We have gone with Suzy, our foreground character, trying to capture her husband, Mark, in a bucket. Mark is a number of metres away in the distance, so they appear on a much different scale to each other.

f/22.0 1/200
-0.33
ISO 500

The placement and eyelines for this scene of capturing a tiny person in a bucket worked well, but with a little tweaking with ground levels, more convincing shots could be possible.

...the camera was positioned at a low angle, looking up at the bucket, which made the tiny person appear to be looking up at the bucket. This created a sense of scale and perspective.



You frame your shot and then need to get your distant subject in such a position that they appear to be directly under the bucket. You'll also need to get the eyeline between your two subjects correct as well. So Mark needs to be looking upwards at quite an angle to account for the scale we are trying to produce. Suzy has to be looking at a spot on the ground, directly below the bucket. The camera we used was a Canon 5DMK2 and a 16-35mm f/2.8 lens. We used an aperture of f/22.0, a shutter speed of 1/160 and ISO 500. We shot at a focal length of about 24mm for most of these type of shots and set the focus about a metre beyond our nearest subject to try and maximise the depth field.

Perfecting the illusion

The bucket shot worked quite well, but to really twist peoples' perceptions, you'll need to get your camera low to the ground to make it appear like they're both standing on the same level. We were able to achieve that with the next illusion of Mark, holding a watering can, appearing to pour water over Suzy with her umbrella. This one works better because they both appear to stand on a level horizon line. Again, the eyelines had to be correct to sell the idea of a small person looking directly up at a larger person.

More ideas

We tried a succession of ideas. Another

successful illusion was the giant football. Suzy and Mark stood a few metres away and pretended to be holding a large spherical object. We put the foam football on a wire and dangled it in front of the camera and set focus just beyond it. Then it was a case of jockeying the ball into position and getting Suzy and Mark to move their hands and bodies to get the shot of them apparently holding up a massive football. We also had a 18" figurine of Darth Vader get in on the action. He was placed close to the camera and Mark was placed much further away to achieve the look of a very tall Darth Vader reaching out for a person, less than half his size. We even got Bailey the dog involved at both a massive scale and also as a miniature pet too.



Parting shot

The last shot was another simple one. Mark sat on the bench again, the right way up this time, and we framed up a very low angle shot with the camera about 2 metres away. Then we got him to take off his shoes and moved them ever closer to the camera, whilst still appearing to be at the end of his legs where his feet should be, to create the 'big foot' illusion of wearing massive clown shoes. Camera settings were still at an aperture $f/22.0$, shutter speed $1/160$ and ISO 500. Focus was set in the gap between Mark and his shoes.

The power of illusion

Hopefully this introduction has got you feeling creative about setting up some optical illusions of your own. The only limits are your imagination, a couple of willing friends to help and the confidence not to mind that passers-by will probably think you've gone more than a little mad! ■



Up in smoke!

Smoke patterns make for fascinating subjects

Wispy, ethereal and endlessly changing, smoke is a fascinating subject that for many, is an art form in its own right. Whichever way you view them, smoke patterns are wonderful organic creations. Thankfully, they are also quite easy to photograph. With a few quick steps, you too can have some smoky art adorning your wall or desktop wallpaper.

The basic setup



- | | | | |
|-----------------------|----------------------|----------------|---------------------|
| 1. Rouge Flashbender | 3. Incense stick | 5. EOS 1DS Mk3 | 7. Manfrotto tripod |
| 2. 600EX-RT Speedlite | 4. 24-105mm f/4 zoom | 6. ST-E3-RT | 8. Work surface |



If you don't have Speedlites or any light modifiers, such as the Flashbender shown left, don't worry. A bright desk lamp or one of the new generation of powerful LED torches will do the job with no problem.

The most basic setup requires the source of your smoke of course, and generally incense sticks are the most preferable smoke generator. You can use them individually or bundle a few together for a greater outpouring of smoke. You'll need to set up your camera with a medium zoom lens. For this example I am using my trusty Canon EF 24-105 f/4 L series lens. Setting your camera on a tripod is handy as it frees up a hand in order to waft the smoke around and the other to press the shutter

button when appropriate and once you have your focus locked in, it won't change. Then you need a light source. A wireless flash would be ideal but of course you can use an off-shoe camera cord to get the light into the correct position. Failing that, a bright desk lamp or even a powerful torch will do the job admirably.

The setup is simple. A darkened room is required as you want your shot to be totally black apart from your lit smoke pattern. Shooting at

night, of course, gives you the darkness you need if your room conditions are too bright. Now before you turn out the lights, place your incense stick upright on a surface and set your camera and tripod in front of it. Compose your shot so the tip of the incense stick is at the bottom of the frame and in focus. Make sure you are using manual focus as you don't want the camera attempting to continually refocus your shots. Our example is shooting in portrait orientation to catch more smoke

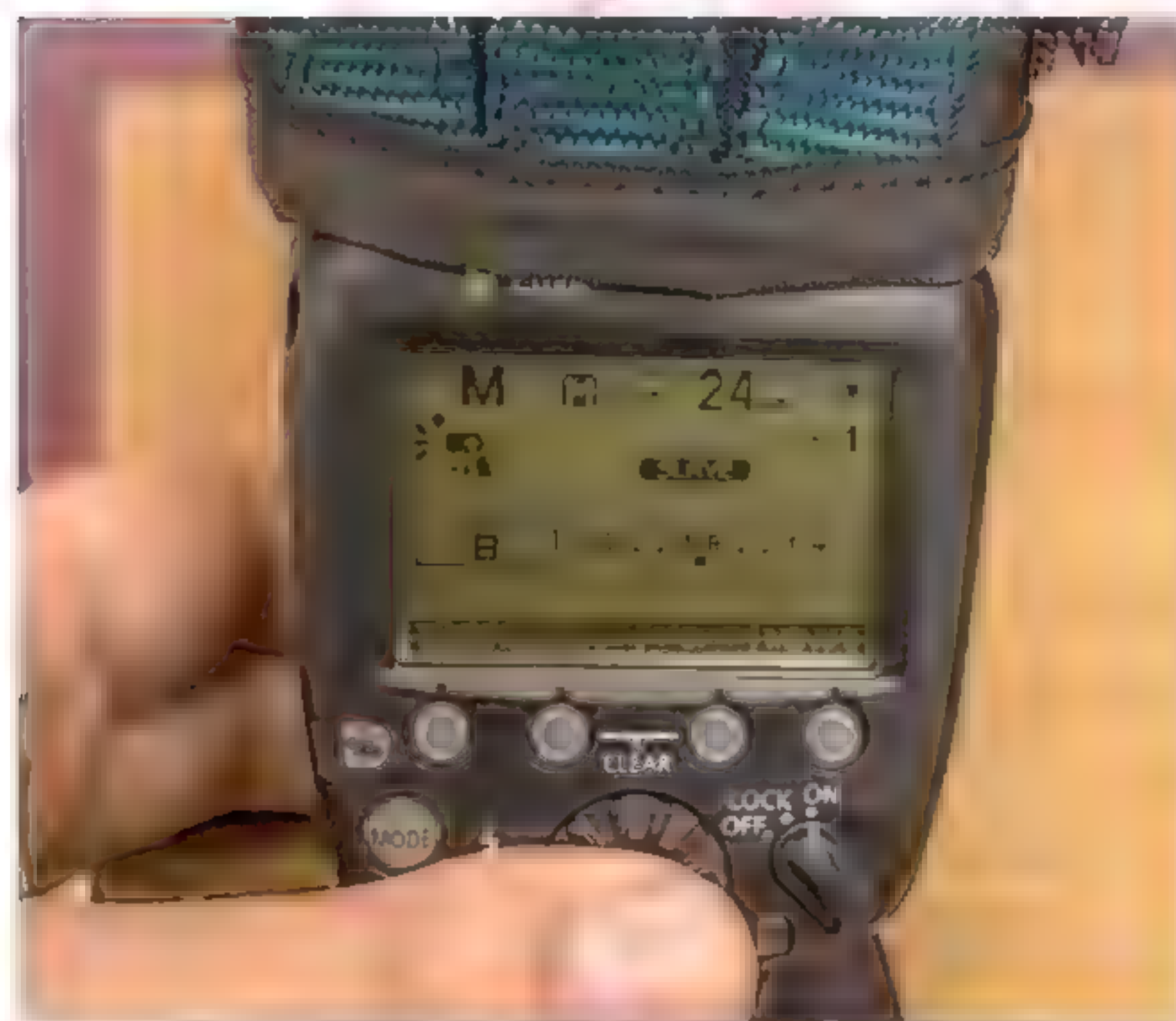
I Set your camera's focus on the tip of the incense stick. You can't reliably predict which way the smoke will move, so this is the best point of focus.



I A shutter speed of 160th and aperture f/6.3 at ISO 100 were enough to render the room black.



I Check your test shots to see if your lights are illuminating the smoke enough.



I At close range, the power output of the Speedlite could be set at 1/8. The flash duration would be very short and freeze the smoke in place.



I For convenience, the Speedlite was controlled wirelessly by the ST-E3-RT transmitter.

as it rises. Make sure you are as far away from any walls or surfaces that might catch any of the light. If you have a matte black surface to shoot against, then all the better.

As in our example, the light needs to be on the left or right of the incense stick at a right angle to your camera. Assume that your incense stick is at the 12 o'clock position and your camera is at the 6 o'clock position. The light source needs to be at either 9 o'clock or 3 o'clock facing directly at the incense stick. Camera settings will be dictated by the light source you are using to illuminate your smoke. Whatever light source you intend to use, make sure that no spill light falls directly onto the lens; this will cause unwanted lens flare and spoil the shot. A piece of black card to block any spill from the light source to your lens is ideal.

For my smoke shots I've used a rather handy device called a Flashbender. It is essentially a foldable mini softbox that is secured to your flash by Velcro. Inside the unit is a silver reflective lining that bounces the flash out through the diffuser panel on the front of the Flashbender. You can use it in its open state as a softbox, or as it used here, you can fold it inwards and replace the standard

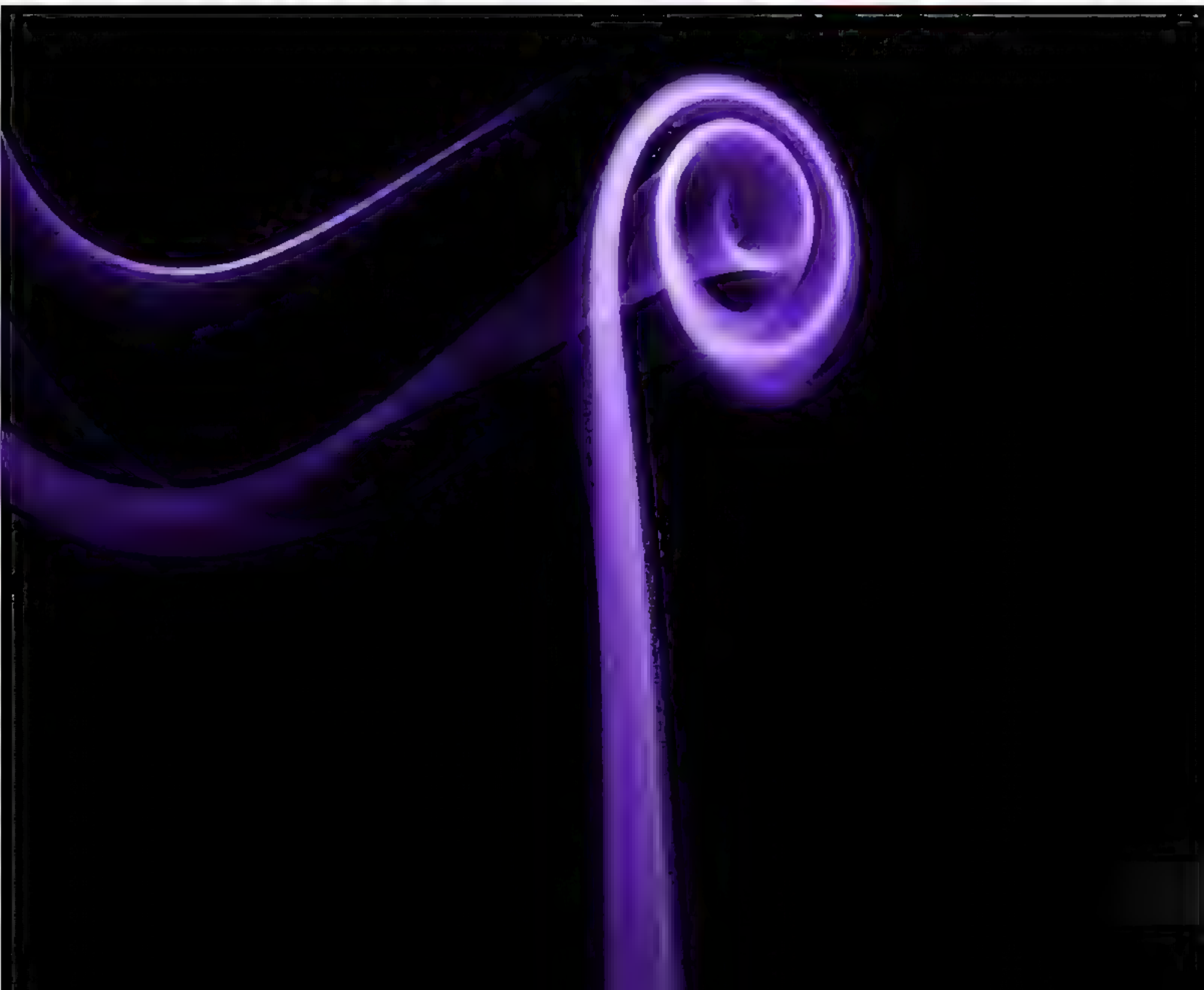
large square diffuser panel with a tall but thin panel that transforms it into a strip light. This makes the light output very directional, which is just what we need for our purposes here.

So, you can light your incense stick, turn on your desk lamp or flash and fire some test shots to see how the lighting is looking. If you're using a lamp or torch you need to dial in settings that render your background black but your smoke lit correctly. Bear in mind the shutter speed is a key factor depending on whether you want your smoke frozen in place using a fast shutter or more soft and amorphous with a slower shutter speed. I tried a few shots using just a bright LED torch and found I could get great results using an aperture of f/5.6, shutter speed of 1/100 at ISO 500. Make sure that your camera is set to shoot in raw format. Just for the extra processing options it will give you later.

In this example, my Canon 600EX-RT Speedlite with Flashbender attachment was controlled using the Canon ST-E3-RT wireless transmitter and was set at 1/8 power. I got my Canon 1DS Mk3 dialled in and was using settings of aperture f/6.3, shutter speed of 1/160 at ISO 100. The composition and focus were ready, so, it was lights out and

time to shoot. If you are in a very still room with no windows open, the smoke will rise very evenly. The fun part is adding a little turbulence to make the smoke 'dance' and create those gorgeous loops, swirls and veils. I've found that using a very thin stick (in this case, another incense stick) is perfect to swipe through the rising smoke column to create circular eddy patterns. A gentle puff of breath will tear the smoke column apart but as it settles down again, wonderful shapes will appear. There is nothing to do but click away and have fun. One word to the wise. Throughout the shoot, our incense stick is doing its job very well and your living room will soon be full of the odour of cinnamon, vanilla or whatever scent your sticks are. It is recommended that you take regular breaks and ventilate the room or it will smell like a new-age gift shop!

You can now take your shots and process them using your favourite software. All you want to ensure is that your smoke is as bright and detailed as possible and your background is dark as possible. This gives you the maximum contrast between your smoke patterns and background. ■





With a low angle and use of a very wide lens, this surfer, riding a barrel wave makes for a dramatic image. It goes without saying that special waterproof housings are required to protect your camera.

Golfers don't like to be distracted when taking their shot. Using a long telephoto lens will keep you a safe distance from your subject who may be taking a very tricky shot.



Action and sports

Capturing movement and excitement

Photographing sports and action scenes is a challenging but rewarding part of the hobby. At almost any sporting event, from the company five-a-side team on a Saturday fixture, to international events like the Olympics or the World Cup, you'll find photographers on the sidelines capturing the action. Professional sports photographers make a good living from it, and use specialised equipment such as advanced high-speed cameras and ultra-fast telephoto lenses costing thousands of pounds, but even the average hobby photographer with basic equipment can capture good sports and action shots with a bit of patience and effort.

There are no hard-and-fast rules for sports photography, mainly because there are so many different types of sporting event. A technique

that might work well for horse racing would be completely inappropriate for beach volleyball, for example. You have to learn to tailor your technique and the way you use your gear to the event you're trying to photograph. Many professional sports photographers will specialise in one particular type of event, becoming experts in one or two techniques that work well and can guarantee them the reliably good results they need.

Although there are as many techniques for sports photography as there are types of sport, there are some general tips that work well in most situations.

Get close to the action

There's a reason why ringside or front-row seats are more expensive. If you want to see the excitement and passion of a close-fought contest, it's a lot harder to do that from 200 yards away



With fast action motor sports, it is often prudent to position yourself in a spot where the vehicles are moving relatively slowly to enable you to capture the action.

“Many professional sports photographers will specialise in one particular type of event, becoming experts in one or two techniques that work well.”

over the heads of a crowd. Get as close as you can without putting yourself in danger or interfering with the event you're trying to photograph. For



events where you can't get physically close, use a telephoto lens to zoom in.

Capture the moment

Although most people seem to think that a fast continuous shooting speed is the key to action photography, in fact the professionals will tell you that good timing and fast reactions are much more important. It also helps enormously if you have an understanding of the sport you're photographing so that you can anticipate when the best moments are going to come along. A camera with a good fast autofocus system and quick shutter response is much better for action photography than one that can shoot at 10 frames a second. Being in the right place is also important. You're going to get more drama at the finish line of a race than halfway down the track.

Control shutter speed

One of the keys to good action photography is appropriate use of shutter speed. Although

the traditional approach to sports and action photography is to use the fastest shutter speed available, and the sports mode on your camera will try to do this automatically, it's not always the best approach. Using a very fast shutter speed freezes the action, which can rob the picture of any sense of movement. To capture fast-moving subjects, try using a slightly slower shutter speed and panning to follow the action. If you do it right you'll have your subject nice and sharp against a movement-blurred background. If you are using a normal telephoto or zoom lens, i.e. not one that cost £3,000, then the restricted aperture at longer focal lengths will limit your choice of shutter speeds; don't forget you can get faster speeds at higher ISO settings, although beware of image noise above about 1600 ISO.

Compose your shot

Just because you're documenting a sporting event, it doesn't mean your shots can't be well-composed. Try to find a viewpoint that provides an interesting angle, or at least an appealing backdrop to your shot. If you can compose your shot so that it both looks good and provides an accurate impression of the event, so much the better.

One of the most useful compositional tips for action photography is the concept of implied movement; always try to have your subject moving into the frame rather than out of it. ■



HDR photography

We shed light on this multiple exposure technique

High Dynamic Range or HDR photography is the technique by which a much greater dynamic range of luminosity can be captured by a digital camera that more closely resembles what the human eye can perceive. It does this by taking one shot, a sequence of shots at different exposure levels and combining them. Later they are processed using software to create the final image. The result is a single image that contains the best of all the individual images. It is a technique that has been used for many years.



Brig upon the Water. Taken by Gustave Le Gray in 1856. An early example of high dynamic range techniques to capture as much tonal range in an image as possible.

Use of HDR

HDR has been with us for some time. It may be a surprise to learn that HDR imaging was being used as far back as the 1850s. Early pioneer Gustave Le Gray used to photograph seascapes, where the tonal difference between sea and sky was too extreme. He would achieve the final image by exposing two separate negatives. One exposure would be balanced for the sky on one negative and a longer exposure for the sea. The two negatives were then combined to create a final print. Although those images were captured more than 160 years ago, the basic photographic techniques have not changed.

Technical limitations

Even the most modern cameras can only capture a certain range of tones between pure white and pure black present in a given high contrast scene. Dynamic range is measured in stops and digital camera manufacturers may quote the maximum dynamic range that their cameras can resolve using that unit of measurement. A stop is essentially a doubling or halving of the amount of the light level received.

The human eye can perceive around 24 stops of light from darkest black to brightest white. Most digital cameras can only capture approximately 12-14 stops.”

A standard 3 shot sequence, 2 stops apart, was used to create the final image you see on this spread. The only setting that was altered during the sequence was the shutter speed.



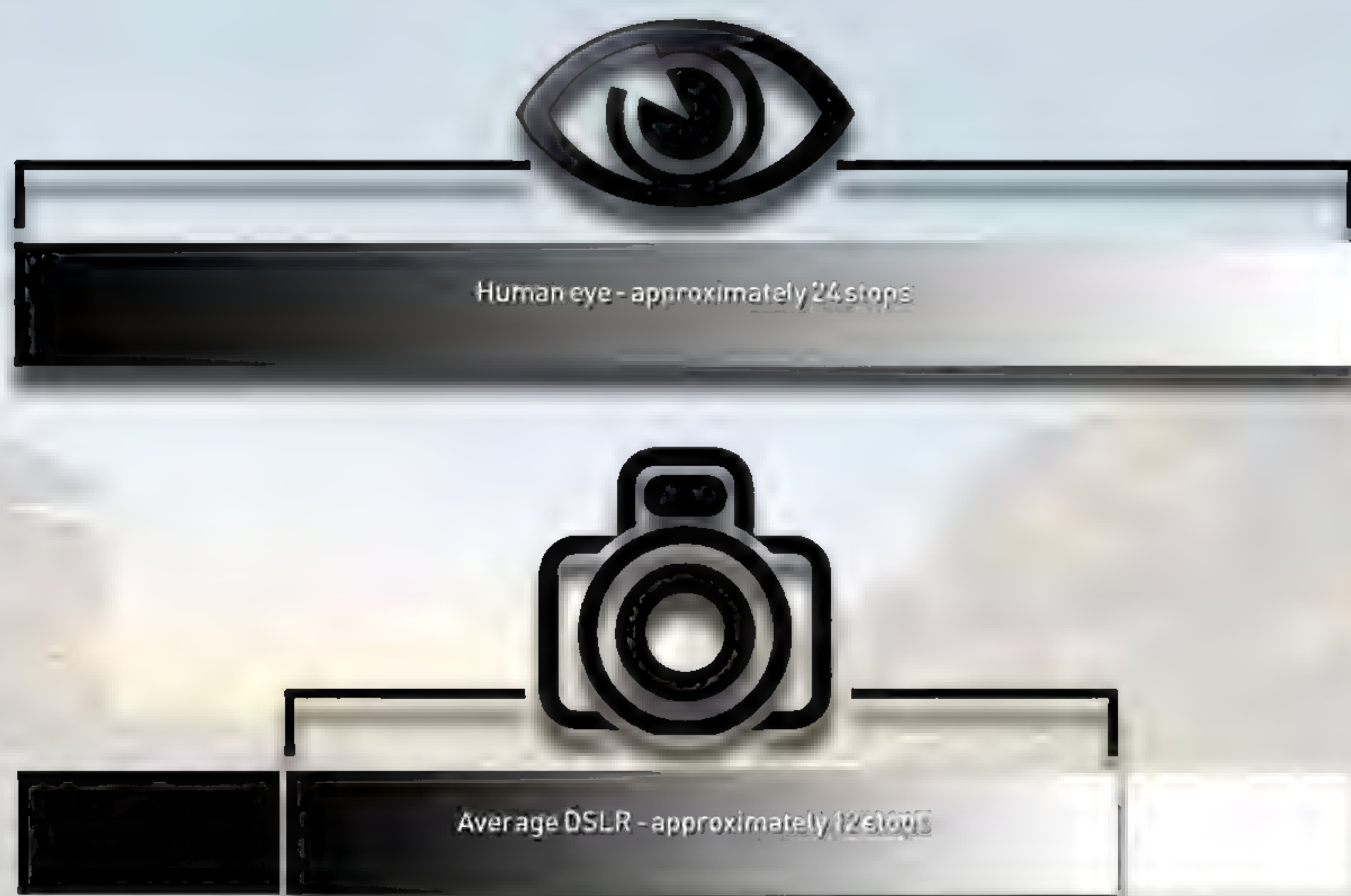
f/14.0 1/60
-2
ISO 100



f/14.0 1/20
--
ISO 100



f/14.0 1/5
+2
ISO 100



This image shows you a simple comparison between the dynamic range that can be seen by the human eye, versus the average DSLR camera.

See what the eye sees

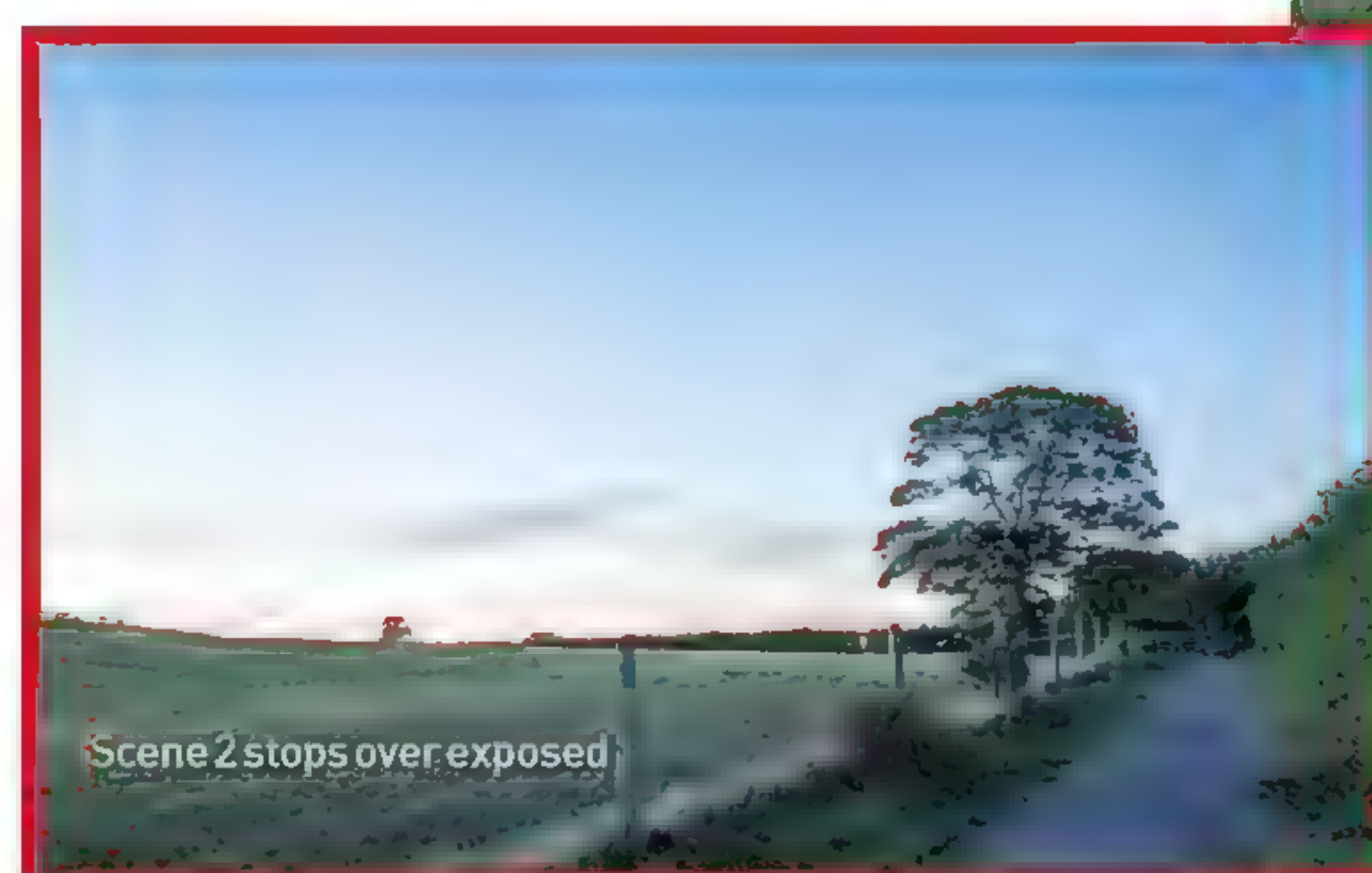
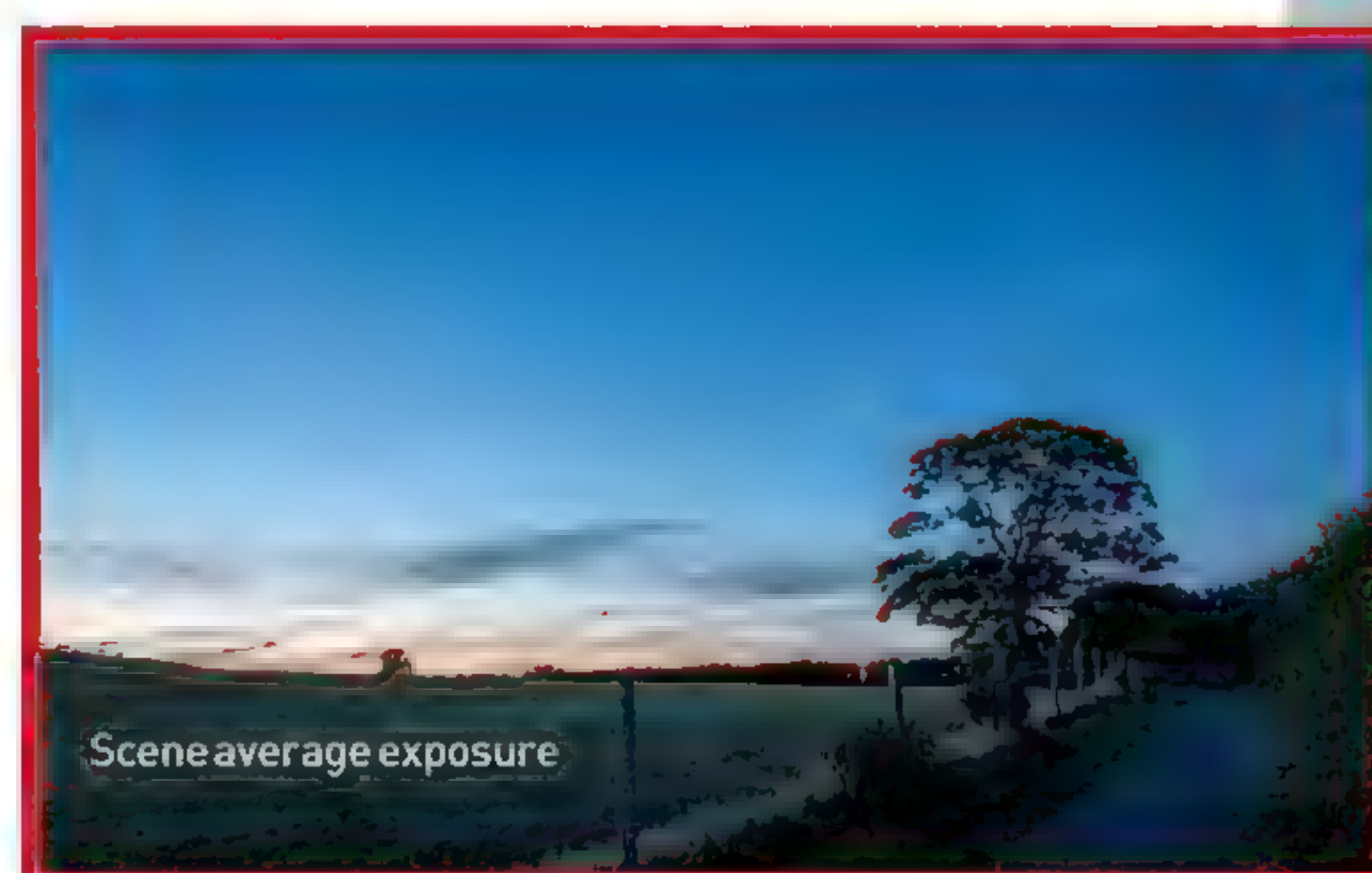
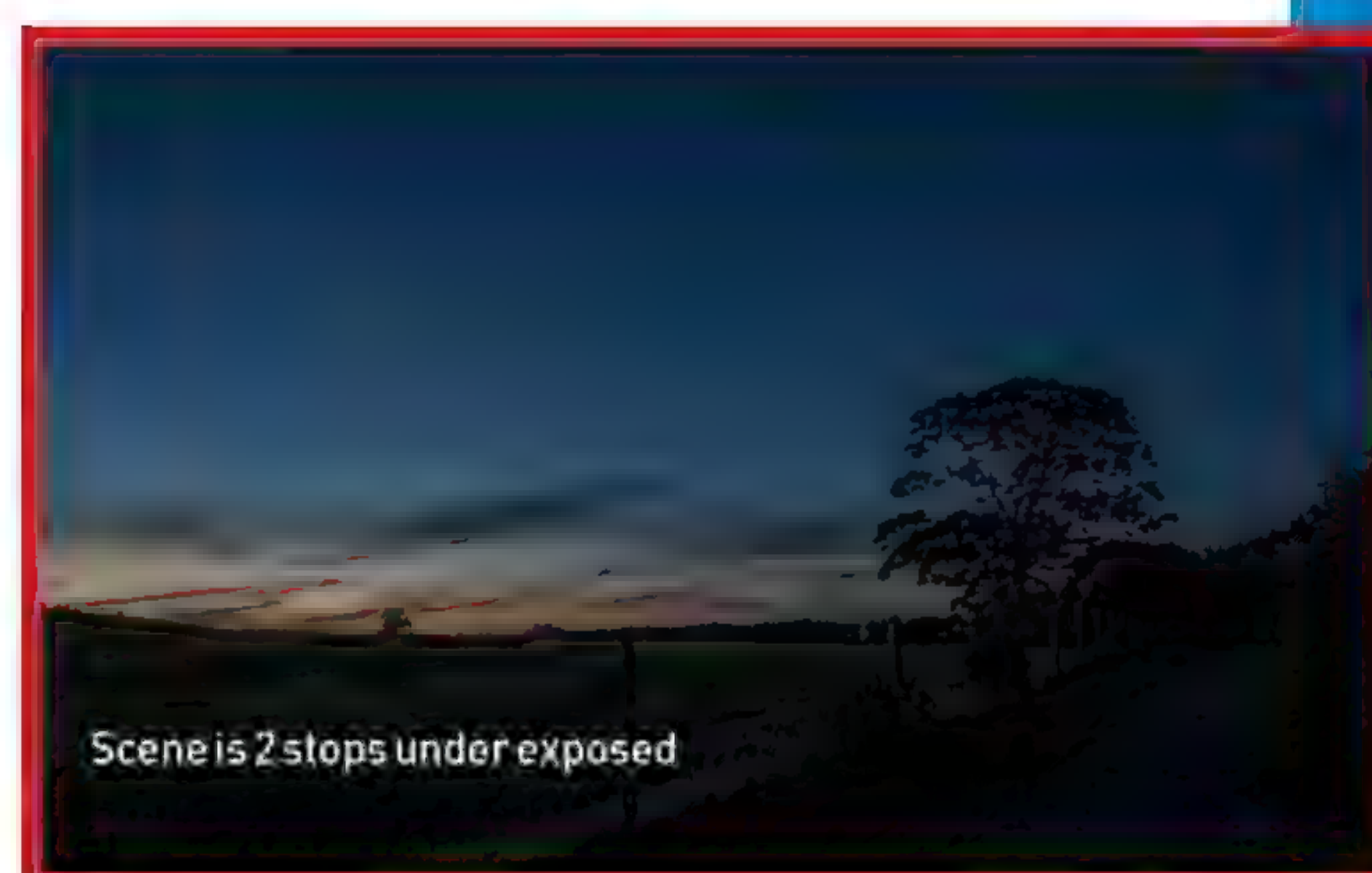
The human eye can perceive around 24 stops of light from darkest black to brightest white. Most digital cameras can only capture approximately 12-14 stops. Currently, cameras like the Nikon D810 and D800E have some of the best dynamic range around. Even this is not enough to fully capture all the light available in the scene like the human eye does. The trade off will be that you have to take a shot that retains the brightest areas of the shot at the expense of losing details to solid shadow; or you retain detail in the darkest areas and face the prospect of the brightest areas blowing out to pure white and losing detail that way.

An example

A lovely sunrise or sunset image with a silhouetted foreground object is a typical example of how much light goes unseen by a camera. Although the sky may look beautiful and well exposed, the foreground object is in silhouette, purely because the contrast between them is far too great for the camera to accurately record. Set your exposure to reveal detail in the foreground object and the result will be a sky that blows out to pure white with complete loss of detail that no amount of processing would be able to recover.

Bracketing exposures

To capture the scene in all its glory, you will need to take several shots of the same scene but with different exposures. This is referred to as Auto Exposure Bracketing (AEB). You'll need one exposure sufficiently underexposed to capture the brightest parts of the scene, such as the sky, correctly. Next is an average exposure



The Nikon D810 has impressive dynamic range but even it can't compare to nature's greatest camera, the human eye.



A good sturdy tripod is essential for HDR photography. You want your shots as rock solid as possible with no movement between exposures. Hand held images are possible but even slight movement between shots can lead to ghosting in the final processed image.



of the scene and finally, an overexposed shot that records the darkest areas of the shot in sufficient detail. The set up to do this is fairly simple. There are just a couple of things to be aware of before you start shooting.

Things to bear in mind

You will be shooting multiple exposures of the same scene and will need to set your camera up on a tripod, so that it is held securely with no chance of camera movement. If you try to shoot hand held, even the slightest movement between each shot could ruin your final HDR image because of image mismatches.



Remember also that certain scenes are not suitable for HDR. Any shot that contains a lot of movement, such as trees swaying in the wind, will result in final images having many ghosted areas, as things have moved between each of the exposures. Nice static scenes work best, although things such as flowing water can sometimes work quite well if you have long enough exposure times to render it soft and fog-like.

It is also generally held that HDR images work to their best effect, if you shoot using an aperture as small as possible for maximum depth of field and acceptable sharpness throughout the scene. Shots with very shallow depth of field can sometimes come out with banding and image artefacts once processed into a final HDR.

The choice of lens to use is very subjective but generally speaking the main subjects for HDR images are landscapes or cityscapes that require a large field of view to take in the scale of the scene. Any lenses that fall within the 16mm -

35mm zoom range for full frame sensors or 10mm - 20mm for APS-C sensors will do the trick but it is entirely up to you.

Getting set up for HDR

Make sure your camera is set up to shoot Raw. We say it time and again but it rings true with techniques like this where you want to squeeze every last pixel of usable data from your images. The technique will still work with JPEG files but if you can, use Raw. Shooting Raw also means you don't have to worry about making sure you set things like White Balance to manual rather than auto in order to keep the white balance consistent across the exposures you take.

Make sure your ISO sensitivity is set as low as possible so that there is as little image noise as possible. Remember that higher ISO values result in more image noise. Most cameras will let you set ISO 100. Some let you go down to ISO 50, although there has been debate as to whether this results in a small loss of dynamic range at this lower ISO

setting. Set your metering mode to Matrix (Nikon) or Evaluative (Canon). This measures brightness and contrast in the scene and determines what the exposure should be to give a good overall average. Then make sure your camera is in Aperture Priority mode. This means you can select which f/stop you use and the camera will work out the other settings. F/11 is a good starting point. Locking down the aperture for each exposure is important to keep the sharpness consistent in each capture.

Next, you will need to select Manual Focus. As a very rough guide, you can focus one third of the way into the scene to get as much front to back sharpness as possible. Manual Focus also means you are able to determine the point of focus rather than the camera deciding for itself. You can use your camera's live view function if it has one, to determine whether the area you want is in sharp focus. If you have a particular object that you want to be the absolute point of focus, then use your camera live view to get that in sharp focus.

Almost there

Then comes the key to getting the exposure range required. You will need to turn on your camera's Auto Exposure Bracketing function. You may need to dip into your camera's manual if you haven't used it before and locate the AE Bracketing function. Here you can specify the sequence of shots your camera takes and just how much underexposure and overexposure will be applied to the shots. Depending on your camera model, you can shoot a 3 shot

sequence. Other models allow you to shoot 5, 7 or more shots as part of your capture sequence. You can also specify how many stops of exposure separate each shot. For instance, a 3 shot sequence 2 stops apart will result in a bracketed sequence that runs: -2 (2 stops underexposure), 0 (averaged exposure), +2 (2 stops overexposure). A 7 shot sequence 1 stop apart would run: -3, -2, -1, 0, +1, +2, +3. Generally, the more you can capture the better.

Here are a couple of bracketing sequence examples. One is a 7 shot sequence where the exposures are 1 stop apart. The other is a 3 shot sequence where the exposures are 2 stops apart.

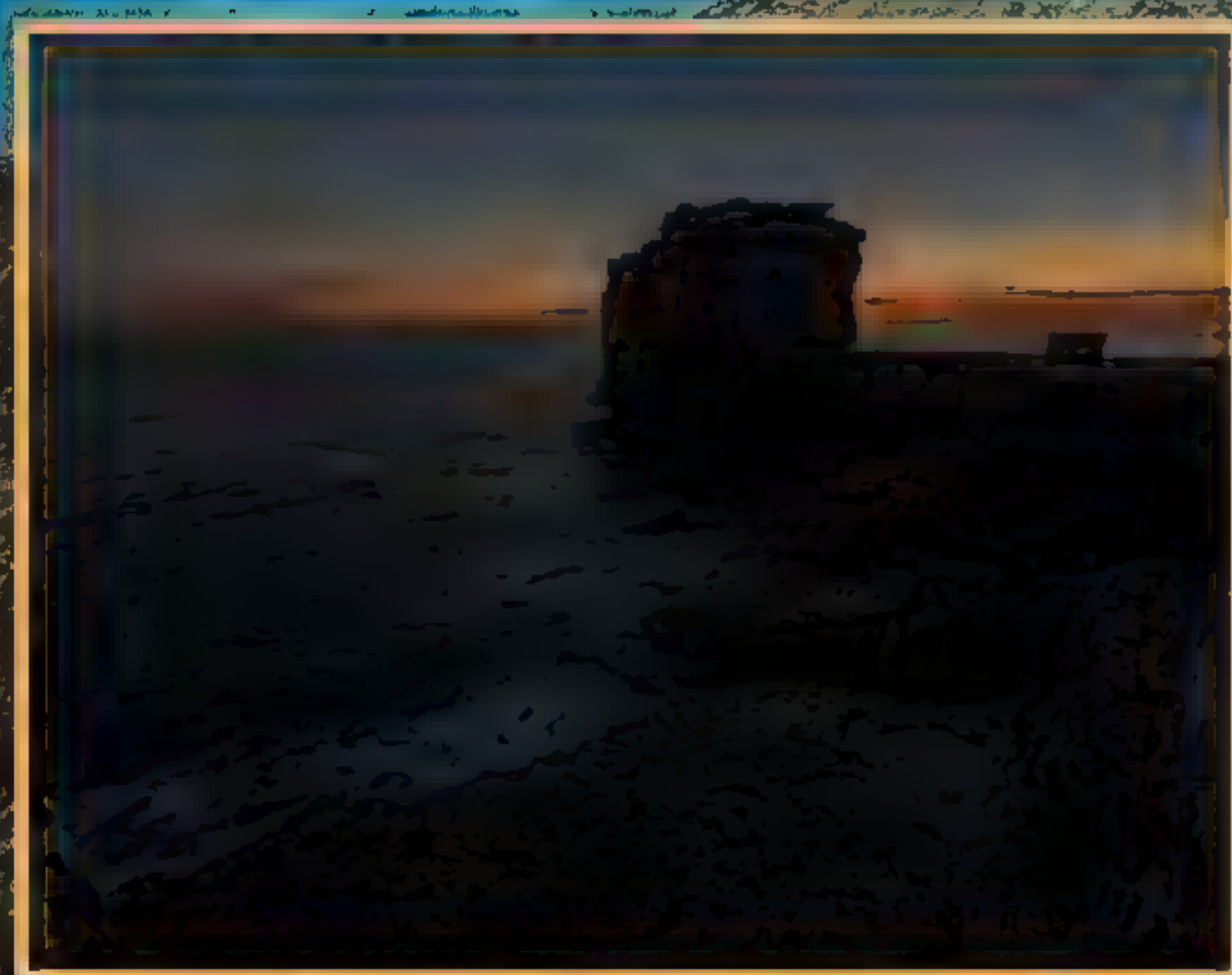


Nikon D5500 screens



Canon 5D Mark III screens

It is worth remembering that shooting a multi image HDR sequence calls for static subjects. Having people, cars or trees moving between each shot will only create ghosting artefacts in your final image when you come to process the HDR image. An exception to the static image rule, is where your exposures are so long, it renders things like clouds or water silky smooth. These blend together reasonably well when you combine your images.



$f/13.0$ 1.0
-1.67
ISO 100



$f/13.0$ 3.0
--
ISO 100



$f/13.0$ 10.0
+1.67
ISO 100

Capture the sequence

When you're ready to take the shot, you have to press the button three, five or more times to get your sequence. This can introduce unwanted movement into the equation. Most cameras can be controlled with a cable release. Better still, have a built in timer or continuous shot function that allows you to just press the shutter release button to make the camera count down for a few seconds, and then fire off the sequence with no intervention required by you. Again, for individual camera models, you may need to find this self-timer function in your manual.

No AEB?

If your camera doesn't have an auto bracketing function, you can still shoot an HDR sequence. You will be shooting in Manual Mode and physically touching your camera to alter the shutter speed but as long as you have a sturdy tripod, it's worth giving it a go. As an example, if you are set up and ready to shoot a three shot sequence that is 2 stops apart in Manual Mode, your average exposure for the scene results in settings of: aperture f/11, shutter speed 1/100 and ISO 100. You can take that shot, then alter your shutter speed to 1/25 for a 2 stops overexposed shot and then alter the shutter speed again to 1/400 for a 2 stops underexposed shot. It's a little more involved and hands on but it will produce your image sequence.

It is images that have been processed like this that give HDR a bad name. One can only imagine why people would want their images to look this way. The colours are super saturated, there is too much micro contrast and it is full of noise and image artefacts.

Make or break time

So you have captured your sequence. What next? You have a number of options. You will need to process your sequence of images in your favourite program. If you have Photoshop, you will also have Adobe Camera Raw (ACR). ACR is not as advanced as Lightroom but it still has a great feature set that is perfect for getting the most out of your images. You can save them as high quality 8 bit JPEG files or 16 bit TIFF files and use a third party program like Photomatix Pro or HDR Efex Pro 2 from the Nik collection. You can also use Photoshop's own Merge to HDR Pro function.

Whether using Photoshop's own HDR toning methods or the third party apps, this is where you make or break your image. HDR has something



of a bad reputation because a lot of the HDR examples you see online are awful in the extreme. Many images are so badly over-processed that they look like a bad psychedelic nightmare with over-saturated colours and a very heavy-handed approach to micro contrast. The key to a good HDR image, is that it should

look natural with a good range of tones. HDR images should be beautiful, not capable of giving you a migraine.

Now you can enjoy capturing and processing your HDR images and start producing photos capable of restoring the good name of this amazing technique.



Pet photography

Time to get our furry friends ready for their close up

We love our pets. In fact for most people they are more than mere pets and become more like family members, the recipients of love, affection and lavish attention. It is likely then that their owners, at some point, are going to want photographs of their furry friends (or scaly, feathery or otherwise). I have a dog, and the number of photos that include him specifically outnumber those of all my other family members put together. However, pet photography presents its own special problems. Animals, as we all know, can be unpredictable, lazy, aggressive, hyperactive and downright cute. If you're thinking of trying pet photography, here are a few pointers to get you started.

Pet personality profile

You don't need to sit the pet in question on a psychiatrist's couch and ask it to tell you about its mother, but before you start snapping away, find out about your subject's personality and habits. Where does it snooze if the sun is out? What is its favourite toy? Is it lazy, sleepy, or does it like to perch on a garden fence or hide

in the grass? Take time to chat with the owner and observe your subject to gain some insight. It's also worth spending a little time getting to know the animal yourself. Cats, dogs, horses, they all have personality, and you need to ensure they are comfortable being around you, and you around them. Scaring a pet right at the outset is not going to make for a particularly happy or productive photo shoot.

Close quarters

Think about getting in close to your subject. If the pet is comfortable with you, and if it isn't too skittish, fill the frame with the pet's face. Get the eyes nice and sharp. Just like humans, this is a natural point of focus, although focusing on the snout of a dog or cat can also make for an interesting image in its own right. A good portrait focuses on the subject and not the background. Yes, there are times when shooting wide can create a great environmental portrait, but make sure you get a good selection of close-ups. A macro lens is perfect for capturing details of the pet, and shooting with a wide aperture keeps any background distractions out of focus.

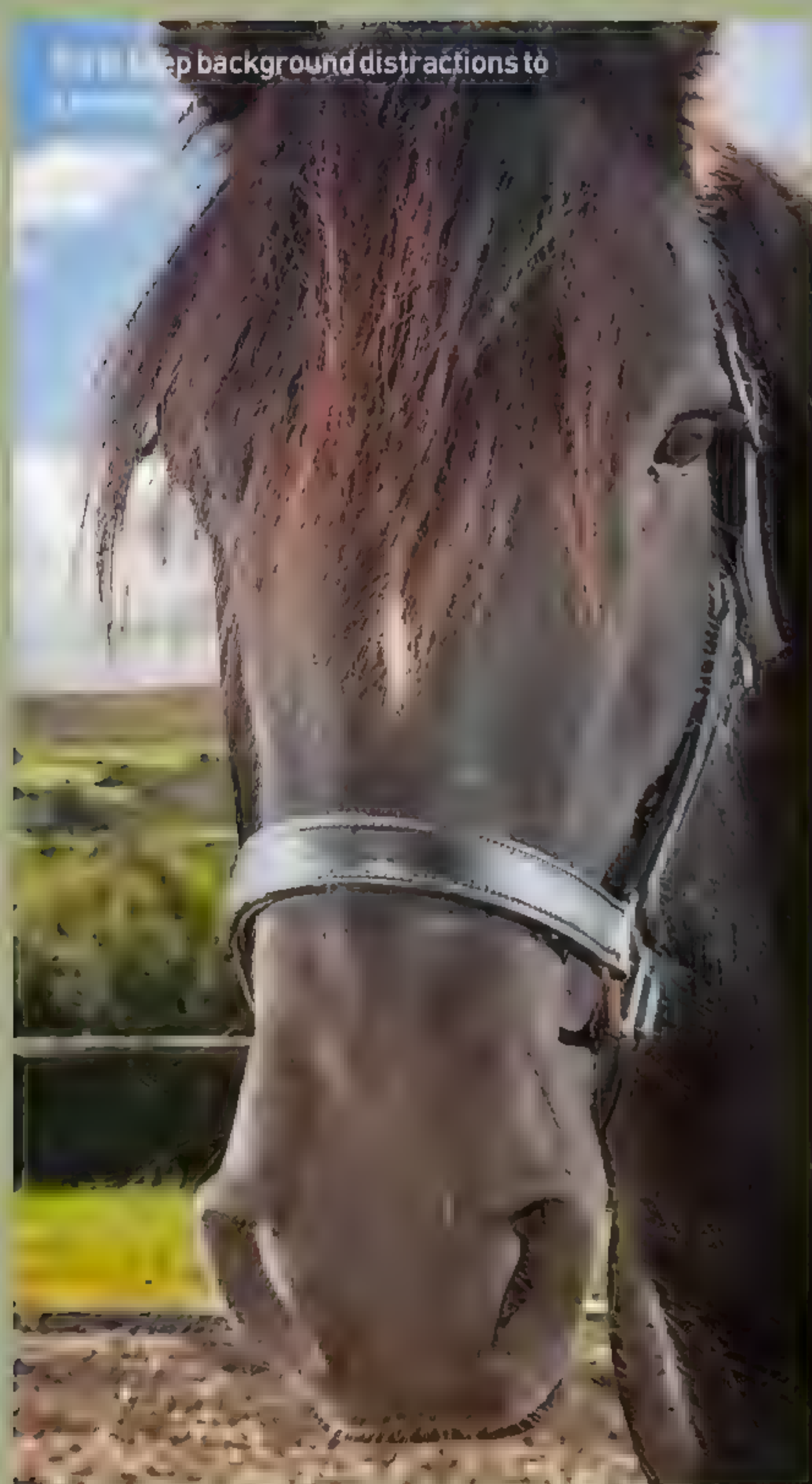
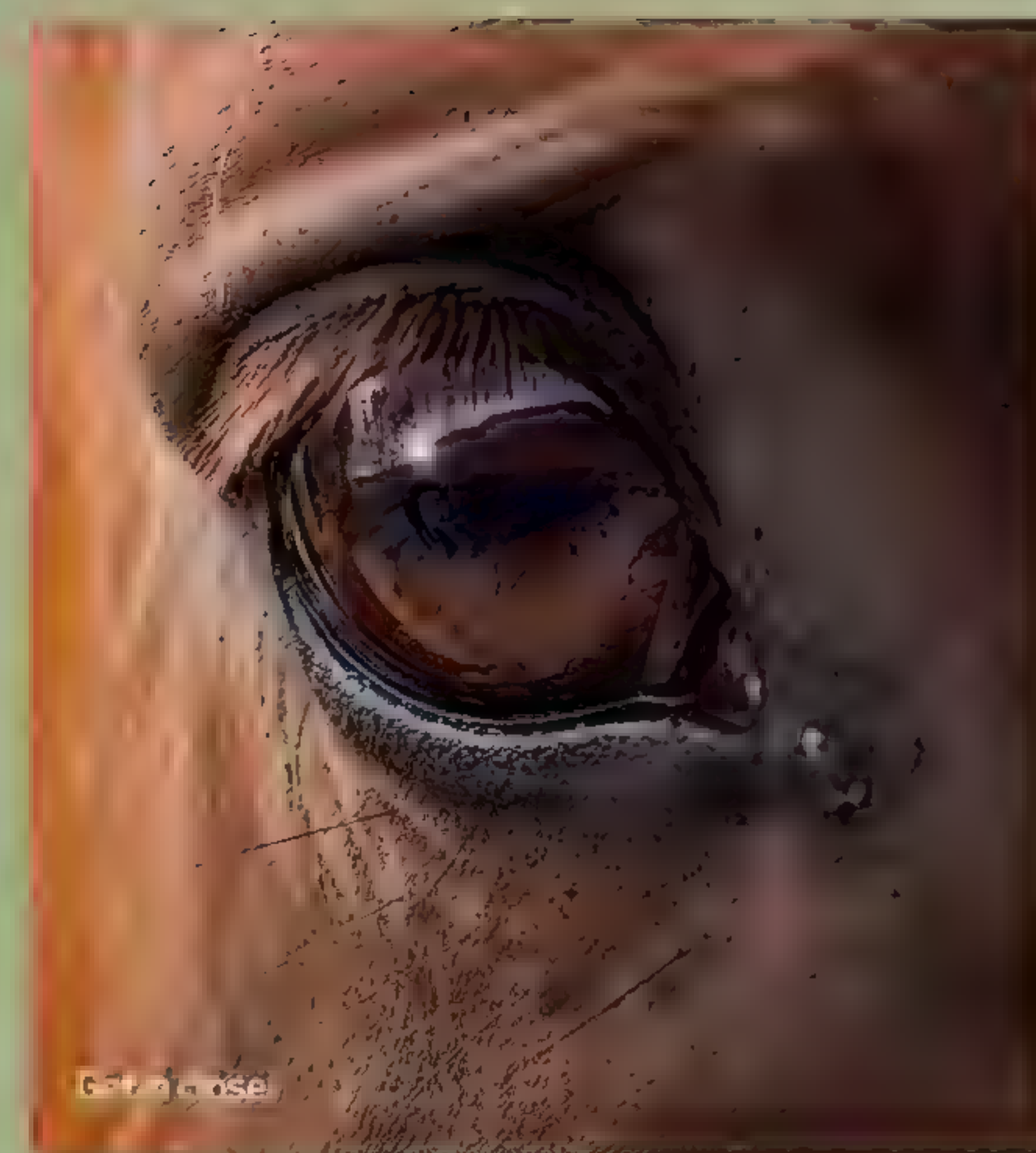
“Get the eyes nice and sharp.
Just like humans, this is a
natural point of focus.”



This image of Phoebe was shot as if it were a human portrait with some dramatic lighting and then being processed to black and white. As with a human portrait, getting the eyes in focus is a key component to draw in the viewer.

Bailey was shot with a Canon EF 70-200mm f/2.8 L lens. The aperture was set at f/2.8 and at the full focal length of 200mm. This produces some lovely selective focus and gives the benefit of a fast shutter speed.





Obviously if the animal is not content to keep still for more than a second, this can be a challenge. Keep snapping away; try using your camera's continuous autofocus to track the animal as it moves. If it's proving too difficult, let the animal play a while, and try again. Pets have very short attention spans, so keep it fun, break it up a bit if you have to and always reward and fuss them when they do well.

On the level

Your average dog is a couple of feet tall, cats even smaller. The average adult human is about 5' 7". If you photograph a pet while you're standing up, all you're going to see is the top of their head and their backs, not what you want for a portrait. Get down to their eye level, and

see the world from their perspective. If you are able, get lower still. Try pre-focusing your camera and just holding it at ground level so you can look up at the pet. It's worth a try just for a new angle on things.

Lighting

When meeting a new animal, bring a flash and, with the owner's permission, while greeting or playing with the pet, fire a couple of test flashes away from them to see their reaction. In daylight particularly, they never seem to mind the flash at all. If they do mind, then stick with natural light and use a white or silver reflector if you need to fill in any shadow areas. Indoors, a bright continuous light may be preferable. I have a photoflood light that, rather

than using old tungsten bulbs, uses three daylight-balanced energy saving bulbs. They are housed in a 22" reflector that I can cover with a diffuser to soften the light if need be. You can also try placing your subject near a window to use the natural light. If I am using flash with a willing subject then I invariably use cross-lighting, avoiding shooting a flash directly at them.

Be patient and carry on!

As they say, "memory is cheap, but memories are priceless". Pets are challenging subjects so you're just going to have to stay sharp and keep shooting. The more you shoot, the greater your chances of hitting that perfect shot!

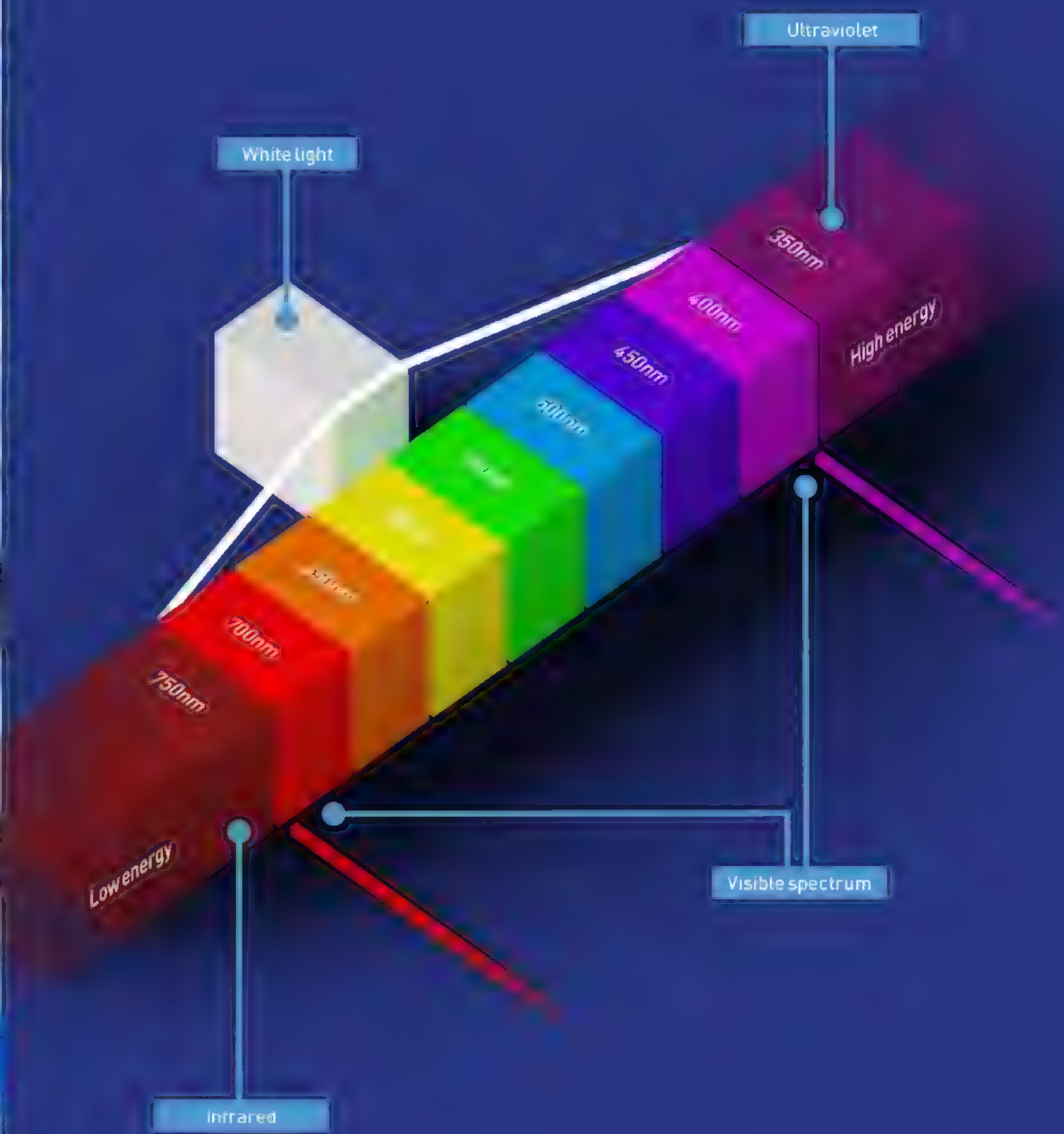
Infrared photography

See the world in a new light

In normal practice our eyes see the world around us and we accept it for what it is. The sky is blue, grass is green, and so on. This is because our eyes can only see certain wavelengths of light. We are only sensitive to the so called 'visible spectrum'. Every time you see a rainbow, you are witnessing this spectrum, broken down into the range of colours we are familiar with, red, orange, yellow, green, blue, indigo and violet. Red sits at the 700 nanometer (nm) wavelength, whilst violet is at the 390nm wavelength. We are going to show you how to capture the invisible world of the near-infrared, which can be found at the 720nm wavelength. The diagram opposite goes into a little more detail about the visible, and invisible, spectrum.

This light is invisible to our eyes, but our digital cameras are capable of recording infrared, with a little help. The images you can capture can be both surreal and beautiful. All objects reflect and absorb infrared light to varying degrees. Plants, grass and even human skin reflect the near-infrared, which will appear as bright green in your image, whilst the sky, rocks and water will absorb more of it and will appear as the darker objects in the image.







The science bit

When white light is split into its component wavelengths the familiar colours of the rainbow can be perceived. Each colour has a different wavelength, measured in nanometres, with violet having the shortest wavelength and red the longest. Although a typical human eye can see colours from about 390nm to 700nm, there is also a great deal going on in the electromagnetic spectrum that we just cannot see. In infrared photography, we use a filter that can block all wavelengths below about 720nm, allowing us to capture light that our eyes and brain simply cannot.

Ok, that's enough physics. Let's get into a practical real-world project and hunt down some of this invisible light.

$f/9.0$	150.0
	--
	ISO 400

A 720nm filter produces a strange colour effect that is often altered in post process to return the sky to a familiar blue colour. It also renders plants ghostly pale.



Infrared (IR) images are actually regarded as the art in some quarters, with some amazing landscape images created in this fashion. The final photos are either presented in black and white, or can be processed in a particular way to create the examples you see here. Capturing infrared photos used to be a complex task, but with the advent of digital technology, it is within the grasp of us all. We are going to take you through the steps to explore this new world of invisible light.



What you will need

You will need your digital camera and preferably a wide-angle lens. A tripod will also be critical, as we will demonstrate shortly. The simplest, and cheapest route into infrared photography, is to buy an infrared filter for your camera, but first you will need to check if your camera is actually sensitive enough to infrared light. Digital cameras usually have an IR-blocking filter placed over the image sensor to protect against the image defects that too much infrared light can cause. It's just how much infrared this filter blocks is what we need to test.

Test the camera

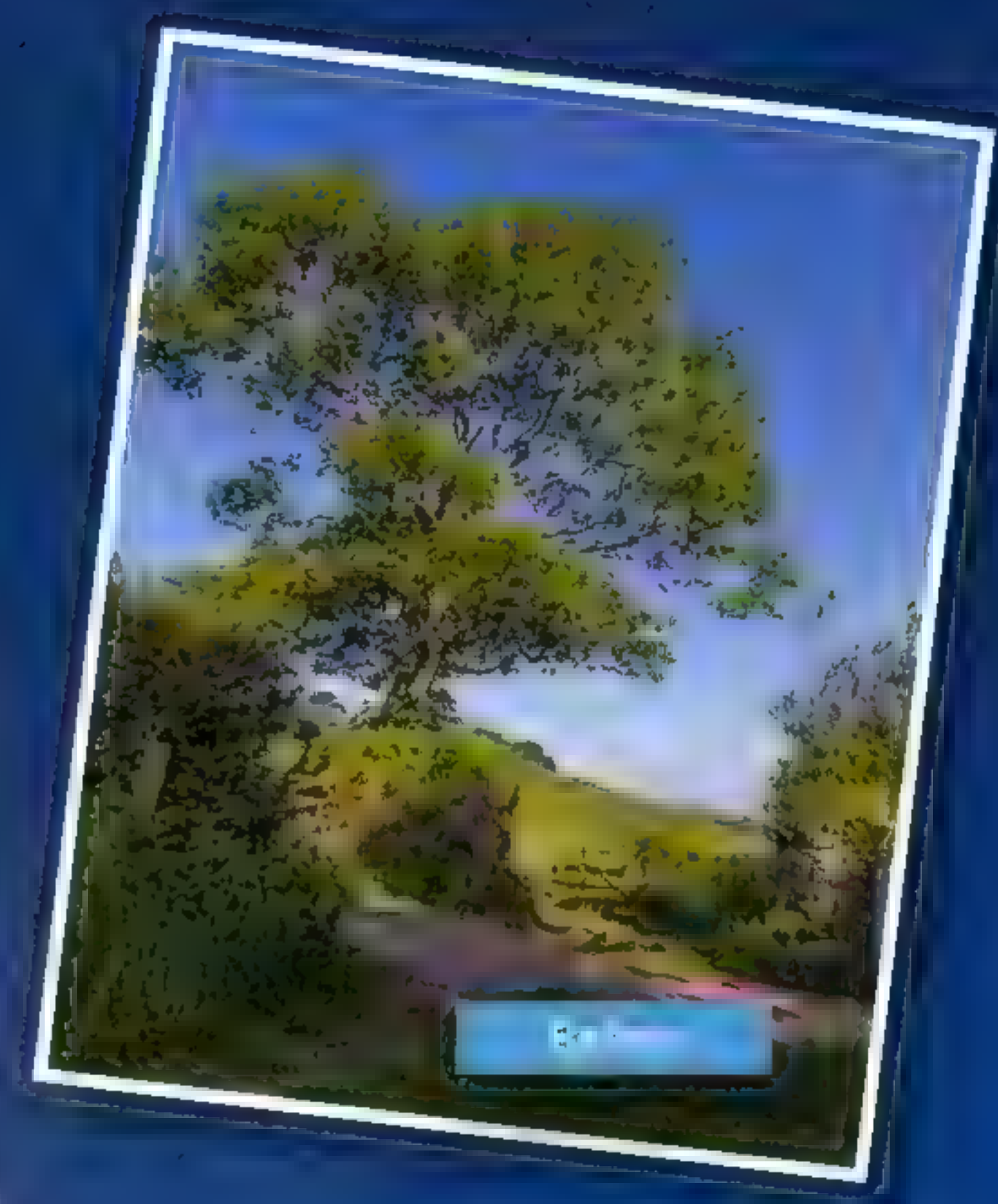
Testing your camera's IR sensitivity is a simple process. Set up your camera in a dim room, and place your TV remote control in front of it, with the little bulb at the front of the remote pointing at the camera. TV remotes usually transmit an IR signal to your TV. If your camera has Live View, switch it on. Press a button on the remote to activate it, and if you see the bulb light up, then your camera is capable of seeing IR light. Generally speaking, the brighter the bulb lights up, the more sensitive your camera is to IR.

Infrared filters

Now you know your camera can see infrared light, you'll need an IR filter. They block out all visible light and allow only infrared to pass. Typically, the 720 nm filter is a good all-round choice. There are any number of cheap third party filters available, but if you want to be certain of good optical quality, then you can't go wrong with the Hoya R72. We were using a Canon 5DMK3 with a 24-105mm f/4 lens that required a 77mm filter thread size. You'll need to check what thread size your lens is and purchase the one you need.



TOP TIP!
Because of the longer wavelengths being captured, the focus point in IR is different than in regular visible light. Many lenses have IR focus marks to help you shift the focus correctly. Other than that, you may need to do some focus testing. Also be aware that a lot of lenses create 'hotspots' on the image, this is a common issue encountered when shooting infrared light.



1/250

“Set up your shot and get everything composed how you want it. Set your autofocus to manual and focus about a third of the way into the scene.”

f/9.0	240.0
	--
	ISO 400

Although cheaper than modifying a camera to full time IR, the 720nm filter will drive up your exposure times. Even this well-lit shot needed 4 minutes!



Modify a camera

If you find you are wanting to shoot IR more and more, you might consider actually modifying a DSLR and turning it into an IR only camera. There are firms who will take your camera and remove the built-in IR filter that sits atop your camera sensor. It is moderately expensive to do, and your camera will only be able to shoot infrared images, which is why a lot of people who have just upgraded to another camera, will modify their old camera. Cost aside, the major benefit of modifying your camera to full time IR is that your exposure times will be just like shooting with a standard camera. Unlike the screw on IR filter option that drives your exposure times up into many seconds or even minutes.

Set the scene

Now you can get outdoors and find a suitable subject. Anything with foliage is a good place to begin. Our shots were taken at a local park, where there were all manner of different trees and bushes. For the best effect, a bright sunny day is recommended. The more your leafy subject matter is directly lit by sunlight, the better.

Compose the shot

Set up your shot and get everything composed how you want it. Set your autofocus to manual and focus about a third of the way into the scene. This is a rough guide to maximising your depth of field which you can tweak as necessary. Don't worry about the exposure just yet. Screw on the IR filter and you will see it has a dramatic impact.



If you look through your viewfinder now, the image will be black. Your Live View may not fare much better, in fact, it will probably show an image that looks very dark and extremely red. Not to worry, this is the filter doing its job. An IR filter is about as dark as a 10-stop ND filter, so you will be shooting some long exposure images.

Camera settings

So, you have your camera and lens set up on a tripod with the filter in place and the shot composed with manual focus. Be aware that your camera's meter is no good to you any more as it cannot measure normal white light. You may find

that a series of test shots are needed to find the best exposure. We set the camera to Bulb mode and connected a cable release. Focusing with IR using wide apertures can be a bit hit and miss, so we had an aperture of f/9 to capture a reasonable depth of field and ISO 400. We also made sure we were shooting in Raw format. After a couple of tests, our settings required an exposure time that ranged between 150 and 240 seconds! We decided that the movement of the clouds and the subtle shifting of the leaves would make for a great surreal shot. With exposures this long, look out for light leaks from your viewfinder eyepiece. Cover it over to stop light getting in that way and

ruining your shots. With long exposures like this, a cable release or plug in intervalometer would be of great use to control the exposure.

Strange pictures

Take a shot and review it. All you will see is a sea of pink and red hues. This is how they should look so don't panic. Check your histogram, and as long as the image seems well exposed with little or no clipping of highlights, then you got the shot. For infrared shots to stand out, it is a great idea to try and capture images that have a mixture of light and dark, texture and form. Safe to say that trees and grass below a blue sky and clouds are the



For exposures longer than 30 seconds, you will need to set your camera in Bulb mode, which allows you to keep the shutter open for much longer periods of time.



During the course of very long exposures, it is wise to cover your viewfinder's eyepiece, as light can leak in here and potentially ruin your shot.



An intervalometer is a useful purchase. You can specify the duration of exposure you need. All you do is press the button and it will control the camera for you.



When you review your shots, the images are bright red and pink. This is how they are meant to look. It just requires some post processing to get the most out of them.



Here we have an IR image with the red hue removed after a white balance alteration. Many favour this look and will present this as a final image. There are also many other processing options. It is all down to your creative vision.



staple of IR photography, but now you can explore this newly discovered world of the invisible and the surreal.

Post processing

This is where you can get creative. Typically, the images require their colour temperature to be reduced way below 2000° Kelvin to eliminate the red hue. An IR image with the correct white balance will reveal a sky that looks almost bronze in colour when you process the Raw image in your favourite Raw processing application. Green leaves and plants take on a very pale blue white tinge.

You can enhance your images just as you would with a normal colour photo. In fact, IR pictures can look quite low in contrast, so it's worth spending a little time to get your shot looking nice and punchy. You can then open this in Photoshop and convert it to mono if that's what you want.

A popular conversion method is to actually return the colour of the sky to blue. You can use the Channel Mixer to swap the red and blue channels. You can then add Hue/Saturation and Levels Adjustments as you see fit. You could also continue to false colour your images in any variety of ways to arrive at a beautiful and totally surreal image. ■



Custom bokeh

Have some fun shaping light

If you have ever shot a subject with a lens that has a very wide maximum aperture, you have no doubt noticed how the out of focus background has a particular quality to it. Bright highlights are transformed into orbs of light by this blurring effect. This blurred out quality is referred to as Bokeh, usually pronounced "boh-ka". The bright, soft, orbs of light (also sometimes called "circles of confusion") are a by-product of the out-of-focus light being shaped by the aperture blades within your lens. If your lens has an 8 blade aperture configuration, then your bokeh shapes will be octagonal as well, although the shape will become less well defined as the aperture opens up to its maximum. It has been known for some photographers to choose a lens specifically for the shape the aperture blades make at different aperture settings.

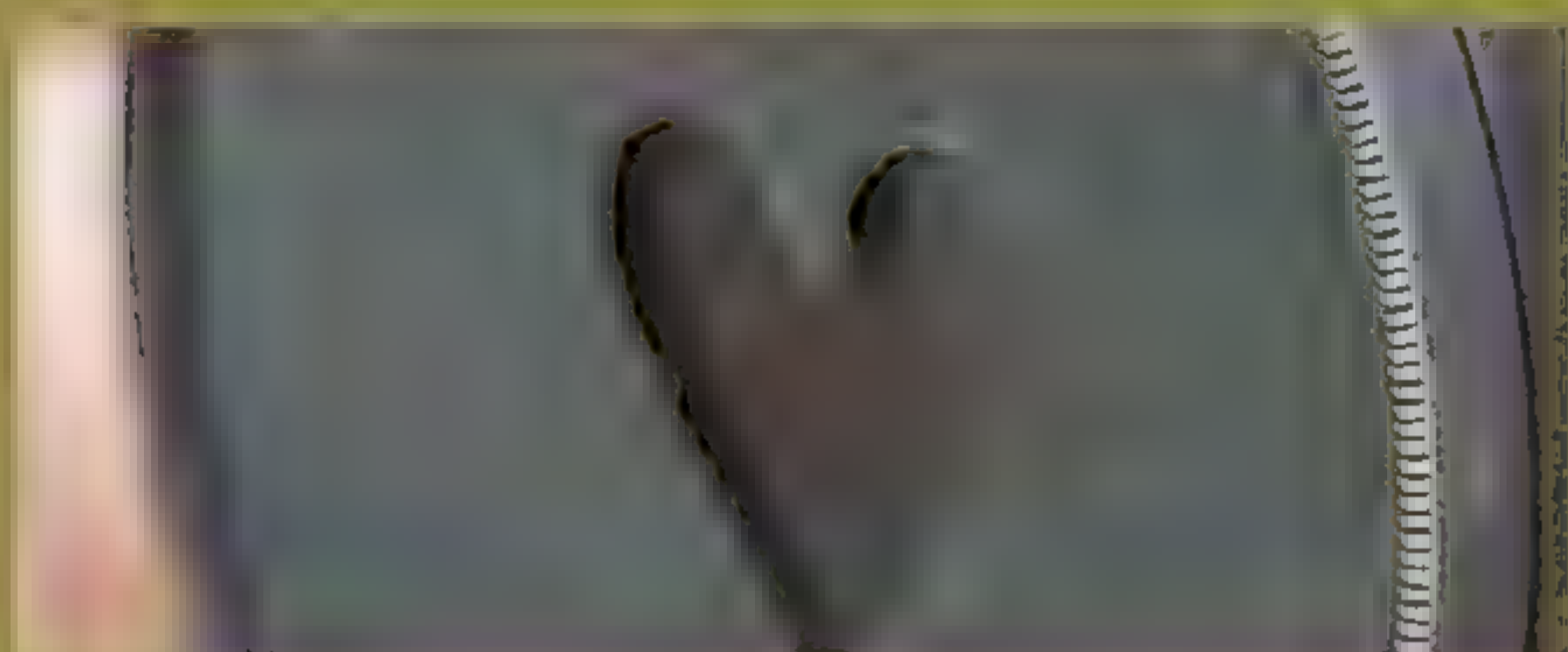


The aperture blades within your camera lens are responsible for creating the shapes of the bokeh you normally see in your shots. We can however, have our own say on what shape they will be.

Getting started



That's all well and good, but there is a very simple way to shape the bokeh to suit your creative requirements. You aren't limited to the the shape defined by your lens. In this guide, we will show you how you can quite literally customise the shape of the bokeh recorded by your camera's sensor. It's nothing more complicated than a piece of card with a hole cut in it!



Things you will need

1. Your camera.
2. A prime lens with a wide maximum aperture. $f/2.8$ or wider is recommended to give the best results.
3. An old UV filter to fit your lens. This helps keep the surface of your prime lens clear from dirt or fingerprints.
4. Some reasonably stiff black card.
5. A pencil and a ruler.
6. A maths compass for drawing the circle to fit your lens.
7. A craft knife.
8. Some fairy lights if you are going to be shooting indoors.
9. If you are shooting outdoors, you'll need to find somewhere at dusk that has lots of external lights, or maybe car headlights passing by on the road, even an amusement arcade or fairground.



1. Firstly you need to describe a circle on your black card to match the diameter of your UV filter/lens. It needs to be the same width as the inner edge of your UV filter/lens, so it will cover it and not have any gaps. Because I am using an old UV filter on my lens, the card can be cut to fit this.

2. I can simply trace around the circumference of the filter with a pencil onto the card. Alternatively you can measure the width of your lens and use a compass to describe a circle which you can then cut out with scissors or a craft knife.



3. Now, in the centre of the circle, draw a shape that you want your bokeh to resemble. Strong simple shapes are best to start with. Make the shape about 1/3 to 1/4 the width of the circle. Here, we have used a love-heart.



4. Carefully cut out your shape from the circle with a sharp craft knife. Then you can cut out the main body of the circle.



5. You should be left with a card circle with your custom shape cut out from the centre. Test fit the card circle in your UV filter or lens. Trim if necessary but try to avoid any large gaps that might let light through.



6. Using small pieces of masking tape or tacky putty, secure your card circle in place on the filter. If securing directly to your lens, take care not to get the front element dirty.



7. Your new custom bokeh filter is in place. Just fit it to your lens and camera and you are ready to start shooting with your very own custom bokeh.

The Canon 50mm f/1.4 USM prime lens may not have the build quality of its L series counterpart but it has great image quality and a fast f/1.4 max aperture for a relatively small price tag.



Shooting your custom bokeh



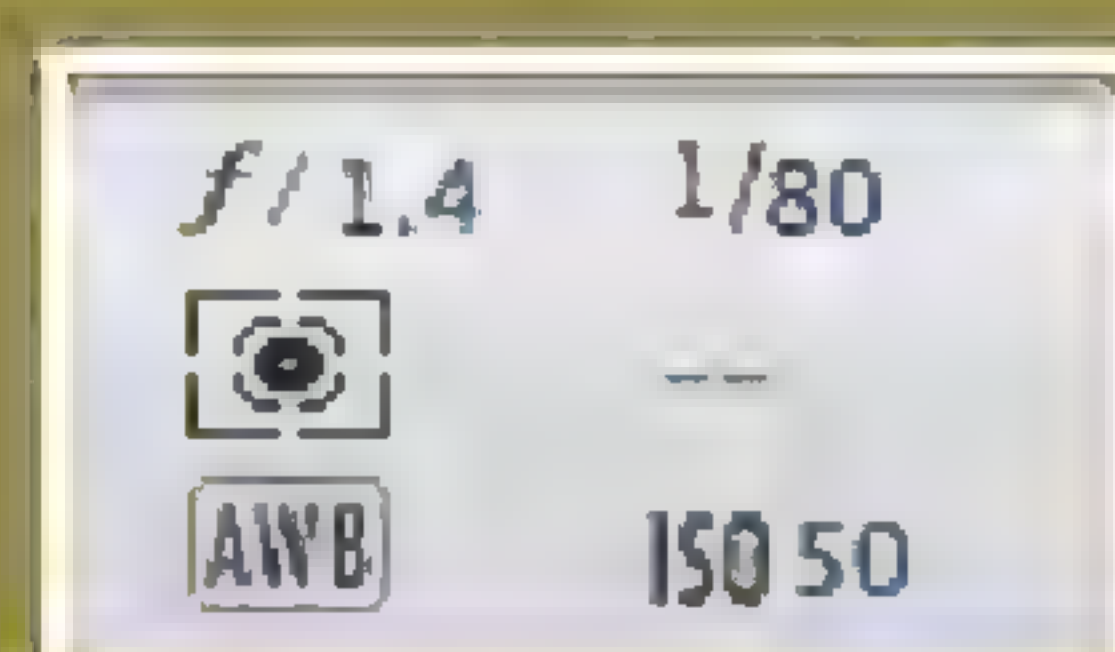
Some fairy lights covered with coloured gels and taped to white sheet will be our bokeh source.



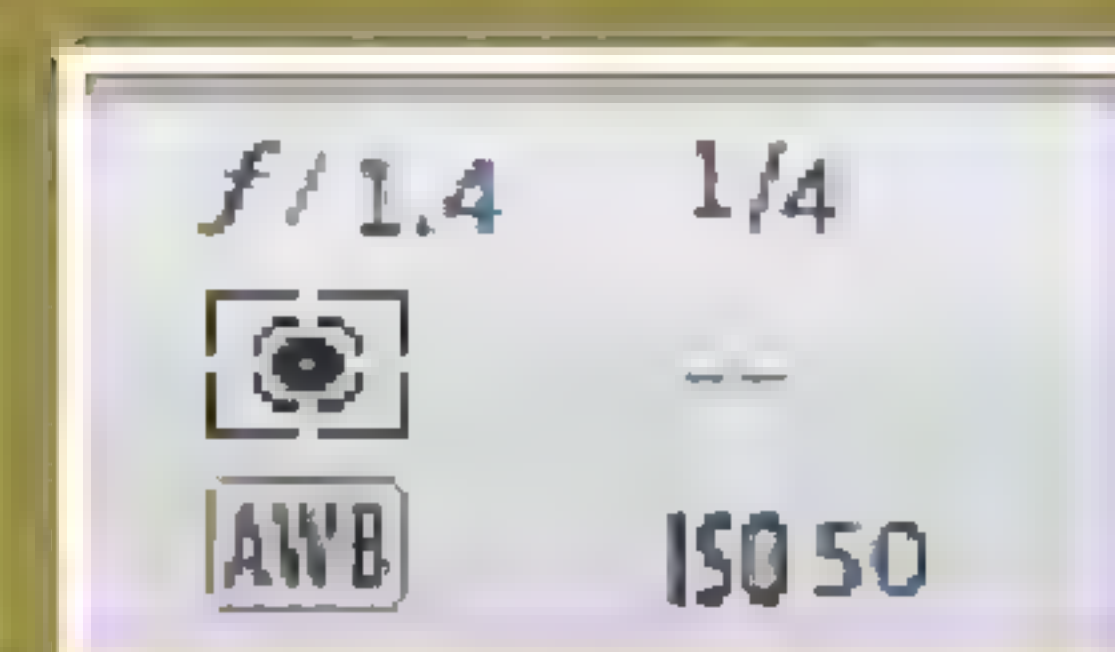
This is how the bokeh created by the fairy lights will look without any customisation.



Once you add the filter, the shape of the hole cut in the card will shape the bokeh to match.



Settings required before the custom bokeh filter is added.



Settings required after the filter is fitted.

The setup can be as simple as you like. You will need a foreground subject and your lights that will act as your out-of-focus background. Bear in mind that you and your subject need to be a good distance in front of your lights so that when you focus on your subject, using an aperture as wide as your lens will allow (f/1.4 on my 50mm prime lens as used in the example) the lights will just be blurry orbs of light.

It is best to start without your bokeh filter on your lens. Compose your shot and take a test image to confirm that the background is as out-of-focus as it needs to be. A tripod may be a good idea if your shutter speeds are slow. Additional illumination on your subject with a flash is fine as long as it doesn't overpower your background lights.

In our example here, the test shot without the bokeh filter on gave us settings of Aperture f/1.4 - Shutter Speed 1/80 - ISO 50. I was at the lens's closest focusing distance to my subject (about 0.5m) and the lights were stuck to the lounge wall about 2.5m away. A quick look at the results showed the lights were nicely blurred.

Now it's time to attach your custom bokeh filter. Once it is on, re-compose your shot as before. You will probably notice a couple of things. First, your exposure settings will have changed and you may notice some dark vignetting around the perimeter of your shot. Both are by-products of adding what is essentially a second aperture to your camera. It is shaping the light certainly, but it will also reduce the amount of light getting to your camera's sensor, requiring a longer exposure time or an increase in ISO sensitivity to compensate. The vignetting, depending on how strong it is, will be something you can correct at the processing stage or just simply crop it out. You will also see that your circular orbs of light have now become hearts, or whatever shape you chose.

Now our settings are Aperture f/1.4 - Shutter Speed 1/4 - ISO 50. As I am shooting what is basically a still life and I am using a tripod, I'm not too concerned about those settings. I take the new shot and voila! The bokeh has been re-shaped and is now yours to control. ■



Still life photography

Sounds simple, but still life is a demanding art form

Still life photography is defined as the depiction of an inanimate subject. You are probably familiar with classic paintings of still life subjects which often tend to be bowls of fruit, bottles, and flowers. Although some might frown upon photographing a still life that mimics an old painting, it actually takes a deft touch with lighting and a skill in knowing how to set up and arrange your particular subjects. In fact, it is said that a still life photographer is 'making' a picture, rather than 'taking' it. Of course still life is not limited to bowls of fruit and such, but on a rainy day, when you're stuck indoors looking for a photography project, a good still life can teach you a lot about light, texture, contrast and composition.

f/8.0 1/100



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ISO 100



The two images above represent the key difference between 'found' still life images and 'created' still life images. The image of rusty old tools in a tool chest on the left could easily have been found by the photographer who decided to record it as it was discovered. The image on the right is obviously a deliberate creation, and has the hallmarks of being lit in a studio environment.

Still life does fall into two categories. The first is 'created' still life which, as the title may suggest, is where the final scene has been crafted and constructed with a deliberate final result in mind. It may also have been lit by artificial means. Daylight or any ambient light was not present

in the final shot. The second type is 'found' still life. This is a subject that has been found and its arrangement has occurred by natural means or at the very least had no input from the photographer in creating the scene that they shot. It is as they found it.

Creating a still life

For our example, we are going to assume it's a bad weather day, and we'll set something up indoors and create a still life. Where do you start? Well, the best idea is to start with something simple, on a simple background, with simple lighting. Sounds simple, right? It is good practice to begin with an object that is non-reflective, if you're new to still life photography, you don't want the additional headache of dealing with unwanted reflections if you're not able to black the room out. Once you've made your executive decision about the subject you are going to capture, you'll need to build a set for it to inhabit. You'll need a surface or backdrop to create your environment for the subject. It can be as simple as the surface of a wooden table or a piece of fabric, cloth or canvas.

Set the scene

Light backgrounds have a light and pleasant mood, whereas dark backgrounds are more dramatic. It is generally held that the background colour should be of similar tones and colours as your subject, perhaps just a shade lighter or darker than the main elements. Although that is the rule, you can experiment with colour combinations that suit your taste.

Your subject

With a background set up, it's time to introduce your subjects. The beauty of still life work is that you can shoot literally anything you want. You can amalgamate several disparate elements or harmonise the subjects to your heart's content. There is a quoted maxim that arranging objects in odd numbered groups (1, 3 or 5 etc.) is more harmonious than even numbered groups. However you do it is up to you.

Lighting up time

When you have your background and subjects ready, it's time to introduce light. This can be as simple as arranging your scene next to a window on an overcast day and using the soft natural light. If that is not an option, then there is no reason you couldn't employ a couple of desk lamps as your primary light sources. Bounce the light of a nearby wall or piece of white card to create a much larger softbox effect to reduce the appearance of harsh shadows due to small light sources, or place the lamp a distance behind a white sheet and turn the sheet into your light source. Some white card can also be used as reflectors to bounce a little light back into the scene to reduce the depth of the shadows.



A simple grey faux leather fabric creates a great backdrop for your still life composition.



Although our final set up uses flash lighting, you can use desk lamps, torches and household lighting such as this bedside lamp shown on the left and still get a great result as seen in the main picture above.

f/10.0 0.6
ISO 50



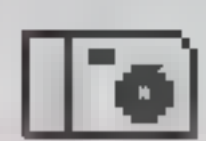


“The colours of the bottle and the brown leather complimented each other well, and the orange gel from the second flash added greater warmth to the scene.”

f/8.0 1/100



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ISO 100



Once the lights and camera settings were dialled in from the previous set up, shooting the second scene was just a case of making sure the lights were in the right place so as to avoid showing up on the glass of the bottle and the tumbler. For any remaining unwanted reflections, the image was processed, opened in Photoshop, and any remaining issues were cloned out of the image.



Next up

Having captured the scene, it was time to set up the next one. This was a subject close to the heart, and liver, of the photographer. We set the brown leather sheet up as we did with the grey one and placed a bottle of single malt scotch that had an interesting bottle design, a glass tumbler, and the cork from the bottle in position. Happy with our lights from the first scene, we could use the same settings as before and just frame the shot as desired. A few test shots and some light position tweaks, we could finish preparing the scene. Some cool

spherical ice cubes were placed in the glass, and scotch was poured into the glass from a beaker. The colours of the bottle and the brown leather complimented each other well, and the orange gel from the second flash added greater warmth to the scene. The scene was set and we could shoot. As we mentioned earlier, watch out if using shiny surfaces in your shoot. Be aware of what reflections are appearing in your objects. We used a little positional sleight of hand to make sure most unwanted reflections of the camera and tripod were hidden by the bottle label.

Post processing

All that remained was to download the shots and pick out the favourite one from the shoot. The processing was fairly straightforward. We added sharpening, some saturation, and also a dark vignette to make the edges of the shot darker to add the mood we were seeking to create and we were done. Why not try your hand at still life photography? Whether 'found' or 'created', still life is a very good exercise in arrangement, composition, and lighting skills, and well worth a go. ■

The stand-in safari

A trip to the zoo can help sharpen your photography skills

The excitement of photographing wildlife in its natural habit on the plains of Africa, or in the Congo basin is beyond all but the most intrepid and experienced wildlife photographers. The images captured can be breathtaking and unlock the wonders of natural world when presented to us on the covers of prestigious magazines such as National Geographic. Experience, funding, and some very specialist equipment is the order of the day for the top-level wildlife photographer.

f/5.6 1/200
-0.33
ISO 800

How about the rest of us would-be wildlife photographers? How is it possible to begin to develop the skills required when Lions and Elephants aren't exactly thick on the ground in the streets of your local town? An excellent place to start is at your local zoo. Agreed, it's not exactly the wilds of Borneo, but there will be a range of exotic creatures big and small that you can try your photographic skills out on.

The animals

If you think about it, the Zoo is a great place to practice. It is a safe environment, and the animals are easily accessible. Obviously some animals, such as the primates, can only be viewed from a distance. In some cases, all that separates you from a Cheetah, for instance, could be a single sheet of clear polycarbonate.

Also, if the animals aren't tempting for the camera, there is also that most entertaining creature, the human being.

The challenge

The zoo environment creates a number of challenges that you will need to overcome. The first is the fact that the animals are often behind a barrier, which means you will have to shoot through glass or plastic. This can be a real challenge, as you will have to deal with reflections and distortions. Another challenge is the fact that the animals are often in a confined space, which means you will have to be careful of your composition. Finally, the zoo environment is often very busy, with many people around, which means you will have to be quick and decisive when composing your shot. If you can overcome these challenges, you will be able to take some really great photos of the animals.

f/5.6 1/200
-0.67
ISO 400



For our 'safari' we went to Paignton Zoo in Devon. We tried to keep our gear choice fairly minimal. We had an old 18MP Canon EOS 550D to which we attached a 100-400mm EF f/4 lens for an effective focal length of 160-640mm to give us a little more reach for shooting distant subjects. For the indoor low light enclosures such as the reptile house, we went with a Canon EOS 5DMK2 and a 100mm macro lens with a maximum aperture of f/2.8. This meant we could attempt to capture some nice close-ups of the creatures in their display cases. We would still have to shoot high ISO images but the wide aperture of f/2.8 gave us a fighting chance of getting some decent images at reasonable shutter speeds. We also had a sturdy tripod if needed for when slower shutter speeds no longer enabled hand held shooting. We also had a 24-105mm f/4 lens that we didn't use in the end. Topping it off was a good camera bag that could be slung over the shoulder and was not too intrusive while walking about.

1



2



3



4



The equipment

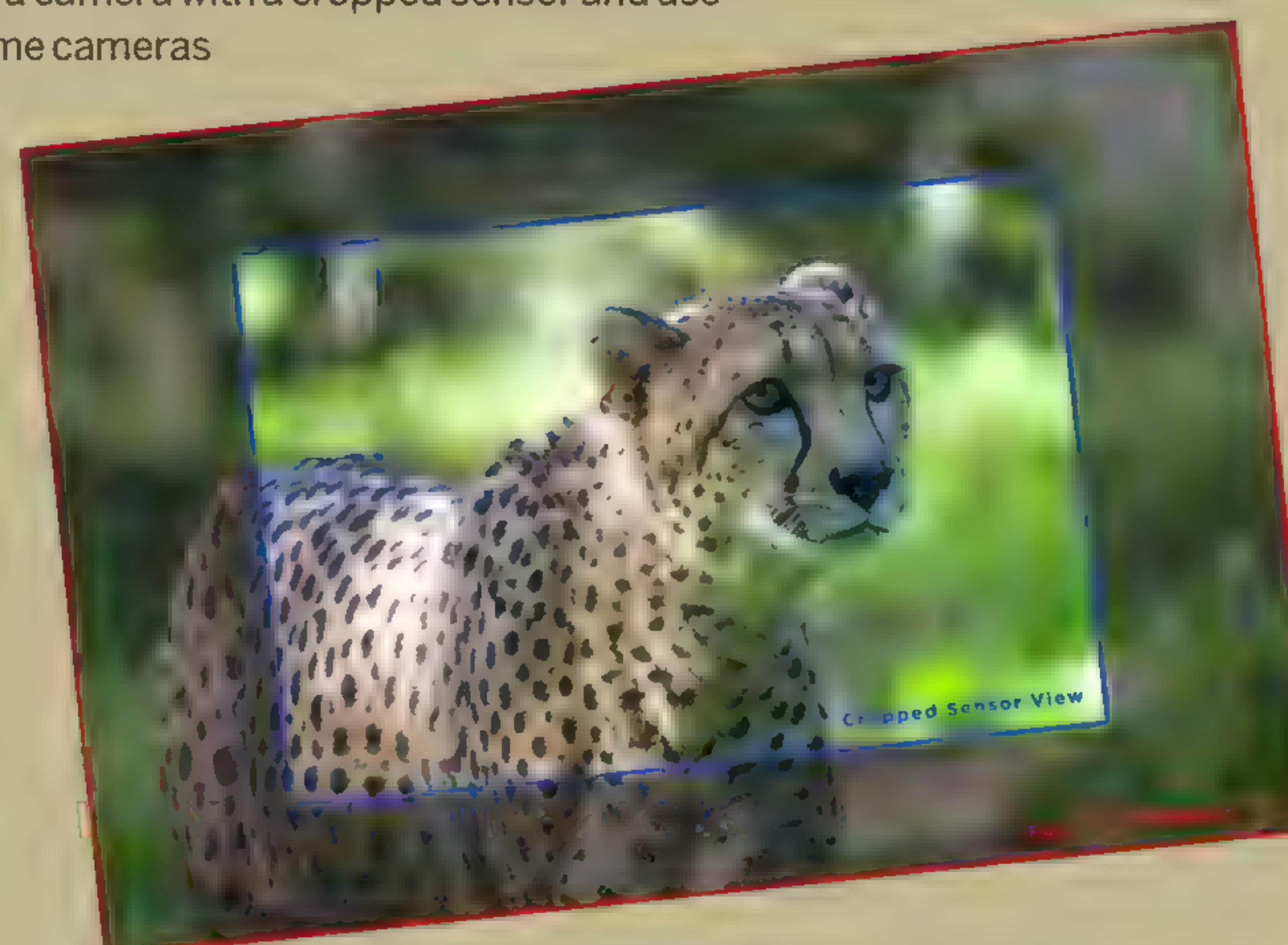
You are planning a trip to the zoo. What should your gear choices be? This will depend on your shooting style, but in the same way a landscape photographer will always have a wide-angle lens in their bag, a wildlife photographer will have a zoom lens. It doesn't mean you have to go out and spend thousands on a dedicated super-telephoto lens such as the Canon EF 800mm f/5.6 at nearly £10,000 [1]. You can actually buy a Korean super-telephoto 650-1300mm f/8-f/16 lens for £150 [2]. You would have to be aware though, that at this price-point, it is not going to be exactly world-class quality. Happily, there are other options. The current crop of super-zoom digital cameras are very affordable and offer optical zoom in the order of 30x to 80x magnification. The Nikon COOLPIX P900 [3] has a 16MP sensor and a massive 83x magnification, which is comparable to a full frame camera with a 24-2000mm lens. If you don't have a super-telephoto, you can always choose to crop your shots in your image editing software. The higher the resolution of your sensor, the more cropping power you'll have.

Double up

If you already have a DSLR with a medium telephoto in the 70-300mm length range, you

The crop factor

Another option is to use a camera with a cropped sensor and use a lens designed for full frame cameras on it instead. As an example, for some of the shots used in this article, a Canon EOS 550D was used with a Canon EF 100-400mm f/4 zoom lens. The lens is designed to project an image onto a sensor 1.6x larger than the one used in the 550D. The actual focal length of the lens does not change but the 100-400mm focal length range on the lens now appears as if it were 160-640mm.



could buy a focal length extender [4] and double the lens to 140-600mm. The big names like Canon and Nikon offer these extenders for around £350, but you could always opt for third party brands like Yongnuo at half the price.

Get close

Now we have some options for shooting at long range. What about close-up? If you have a macro lens or your camera has a macro setting, then remember places like the reptile house or butterfly enclosure might allow you to get some interesting macro shots. In both cases, whether shooting at long focal lengths outdoors or shooting macro indoors with low light conditions, a tripod will be essential to keep your images free from motion blur. Be aware when moving indoors to a simulated tropical environment from a cold outdoor setting, that you risk your camera and lens fogging up when the cold metal and plastic of your gear hits the humid air of the much warmer enclosure.



When cold camera equipment meets warm humid air, the result is fogging of the lens and viewfinder and the chance of condensation build-up on your gear. If you can, make the transition between the two as gradual as possible. Some photographers have been known to put a cold camera or lens under their own coat in an attempt to warm it up a little before going into a humid environment.

Scout around

When you arrive at the zoo, it's generally a nice idea to walk around first and figure out where the best shooting angles might be for any given enclosure and when certain animal's feeding times might be. If you have to shoot through cages or bars, are there any apertures big enough to let you put the lens through so you do not capture any distracting zoo hardware in your shots? Failing that, shoot at your widest aperture for shallowest depth of field with the bars close to your lens and capture the animal at a point furthest from you and the cage you are shooting through. With a little luck, the cage will be out of focus enough not to distract too much. If you are shooting through glass, pick a spot where the glass is clean (or give it a wipe) and shoot square on through the glass, even pressing the lens hood against the glass to try and reduce as much unwanted reflection and glare as possible.



Eyes open

When you photograph a person, a key consideration is to get the eyes in focus to connect the viewer to the subject in the shot. That holds true when photographing animals too. Make your focus point the eyes of your subject, or the eye closest to you if they are at an angle. If you are photographing a smaller creature, get down to their eye-level if the conditions and enclosure allow it.

Photographing a pot bellied pig whilst standing up means you only see it from a human perspective. Photograph it from its point of view for a more intimate shot.

Wait for it

Animals are unpredictable to say the least. The best kind of wildlife photography shows animals displaying behaviour, rather than just sitting immobile. Be prepared to sit and wait, with your

eye glued to your viewfinder, for something to happen. It might sound odd, but keep both eyes open whilst looking through the viewfinder. Your peripheral vision in the eye not looking through the viewfinder helps you to spot something that might happen in the wider context and you may 'see' the shot coming. Be on your guard for two baboons to start squabbling or for lion cubs to start play-fighting whilst the lioness looks on. You just never know.



f/2.8

1/160

ISO 1600

Low-light situations require a combination of high ISO sensitivity and large apertures to arrive at usable shutter speeds. You may have the added stabilisation of pressing the lens flat to the glass of the enclosure otherwise you need to keep the basic rule of the Inverse Focal Length rule in mind. Basically, if you shoot with a 100mm lens for instance, your shutter speed should be at least 1/100th of a second or faster. In the case of this iguana, a 100mm macro lens was used, and we managed to get a shutter speed of 1/160th as well as pressing the lens flat to the glass of the display.





f/5.6 1/1000
-0.67
ISO 400



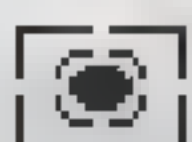
The back wall of the cheetah enclosure was covered in foliage and no man-made distractions could be seen. It was a case of waiting for the big cat to walk by this particular wall and capturing a series of shots as it passed by.

f/5.6 1/160
-0.33
ISO 800

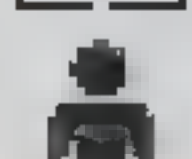


This lion was far too close to the fence to avoid the criss-cross pattern of the wire being visible. In cases like this, why not just make a feature of it? An image like this might have more impact and can be more of a statement.

f/5.6 1/500

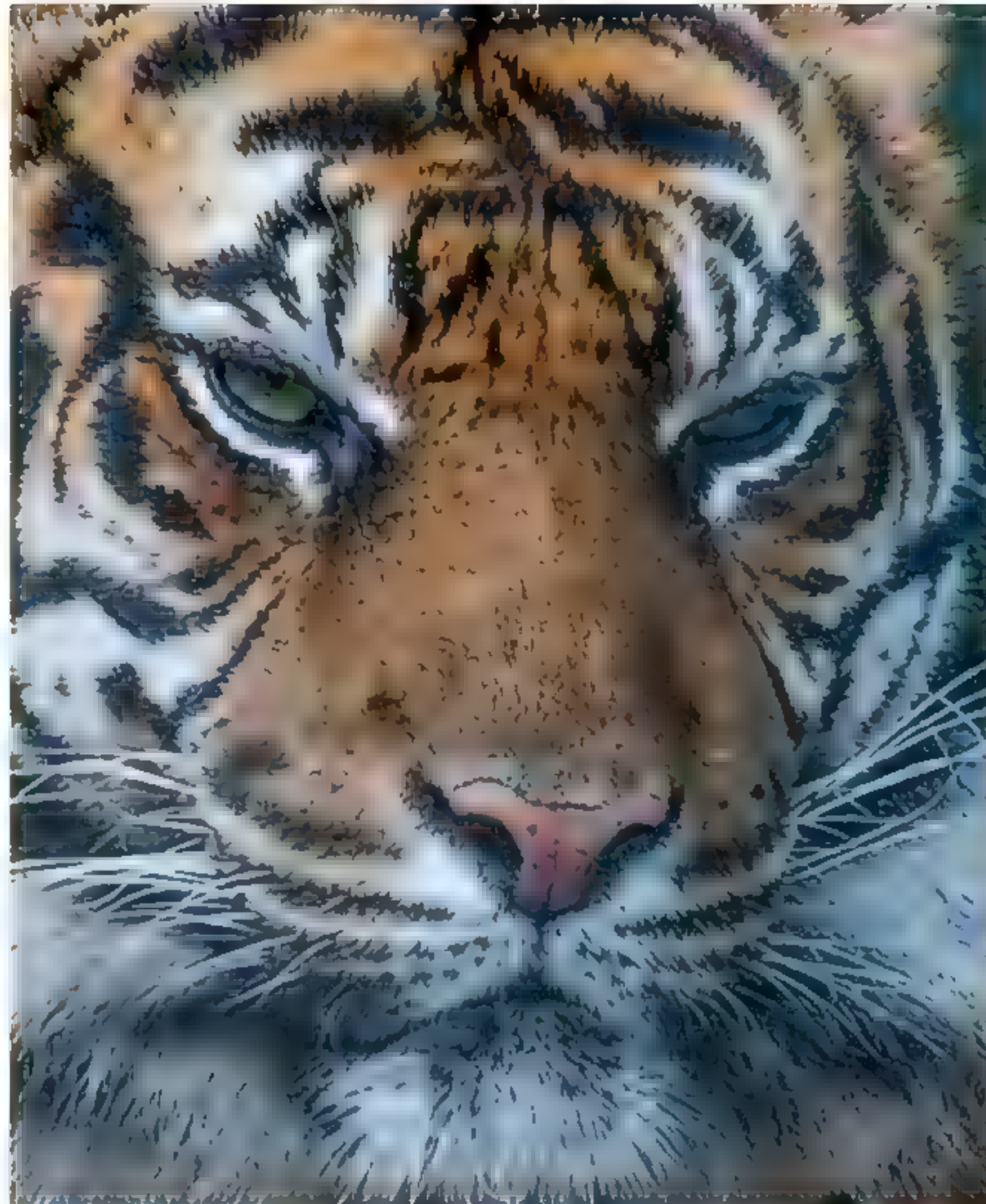


-0.67

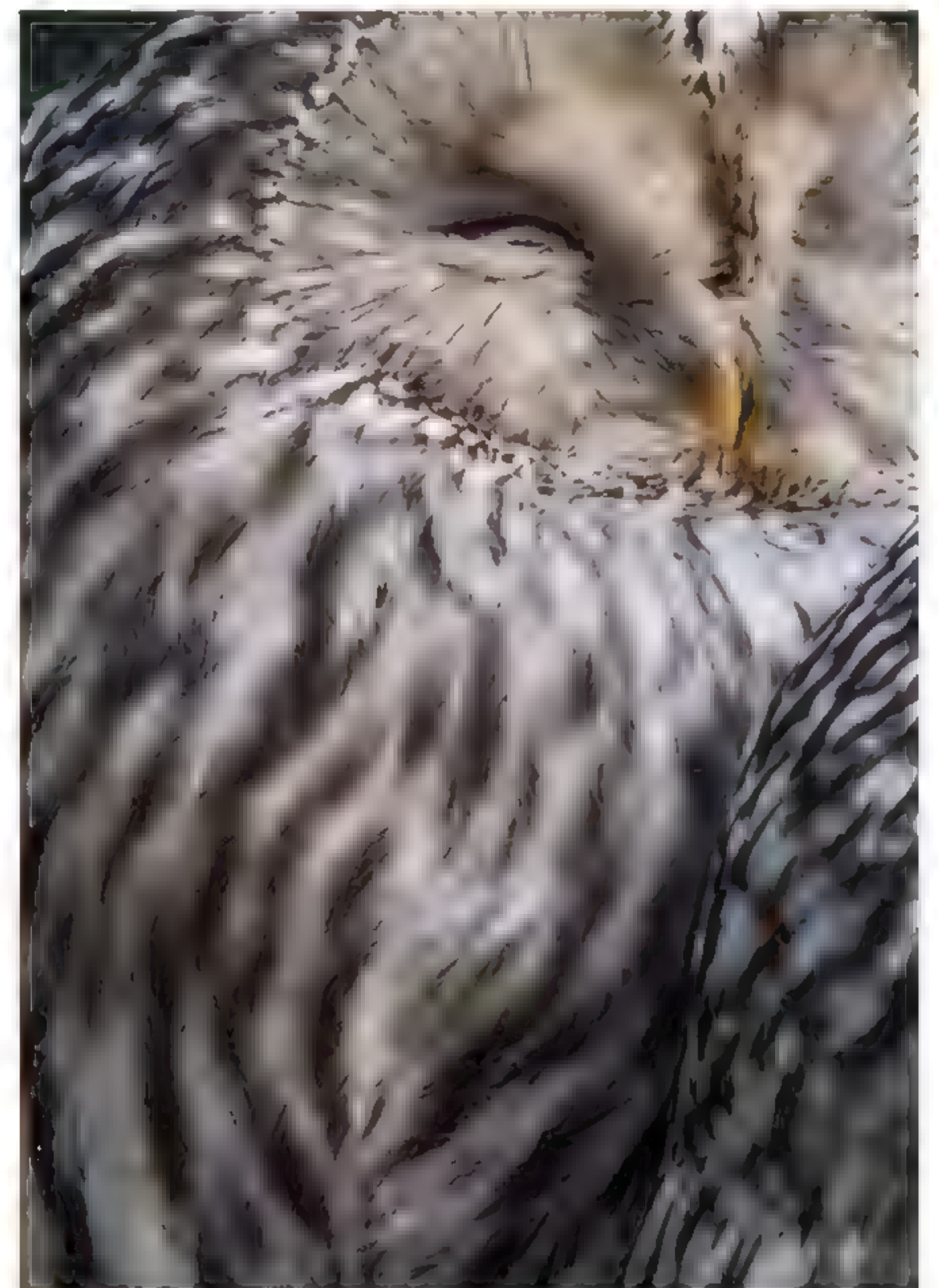


ISO 400

A tripod can double up as a monopod at a pinch if you are in a tight spot as shown below. Although not as stable, it will help you keep your camera a little more solid as you go for those shots where shutter speeds are too slow to enable you to go hand held.



Sometimes, no matter what angle you shoot from, there may always be some man-made object that gives the zoo environment away. In cases like that, you can also crop images very tight for a more abstract feel to remove as much of those unwanted distractions as possible.



Think fast

Most of your subjects will be moving targets. Keep your shutter speeds high and you'll eliminate camera shake. Shoot in Aperture Priority and dial up your camera ISO setting and keep your aperture at its maximum $f/2.8$ - $f/4$ if you have it, and try and get your shutter speed to $1/500$ or beyond. It's better to have a noisy but sharp image due to high ISO, than a completely unusable blurred image of a chimpanzee leaping from tree to tree. If your camera has a continuous

shooting mode, activate it. You can shoot a small sequence of shots and stand a better chance of getting the 'moment' you were after within that sequence.

Lock on

For shooting animals in motion, focusing mode is down to your style of shooting, but a good place to start is with AI Servo mode. This mode allows you to lock an AF point on your subject, and while depressing your shutter button half way down, it will continue

to track the subject as long as you keep the AF point on the subject as it moves. It can take a bit of practice, and certain focus tracking systems may not be so sensitive in low light.

Above all else, abide by the rules of the zoo, always be courteous, do not attempt to put yourself or the animals in danger in any way and be mindful of using flash that might startle the animals. Take many shots, memory is cheap, you increase your chances of nabbing a cool shot if you shoot more. Finally... enjoy your day at the zoo. ■

Cross-polarisation photography

Where cheap plastic becomes fantastic!



The circular polariser is one of those filters that we should always have in our camera bag. Along with neutral density filters they are always useful when out on a landscape shoot. Circular polarisers are used primarily to darken blue skies and make clouds whiter. They are also excellent at managing glare and reducing reflections from shiny surfaces like water and glass, as well as eliminating haze. A useful filter to have then? No doubt, but polarised light also has quality to it that can turn basic, cheap plastic items into psychedelic art pieces. A circular polariser is the key to this effect.

Cross-polarisation photography actually stems from a scientific process that is employed to find weakness in glass and plastic. For our purposes, we can use this technique to place plastic objects under polarised light and record the outcome on our camera. It is fair to say the outcome is definitely something to behold. This kind of photography was all the rage 20-30 years ago and it still has its followers today. If nothing else, it makes for some spectacular abstract images too. To do this, you will need a few items to get the results you need.

What do you need?

First of all, you will need clear plastic items.

The cheaper and nastier the better. We found some plastic spoons, plastic glasses, a child's geometry set, all made from cheap industrial plastic. Dig out your circular polariser from your kit bag and attach it to your favourite lens. If you are buying one, you can pick one up on Amazon starting at as little as £10. Our setup uses a Canon 5DMK2, an EF 24-105mm f/4 lens and a Cokin circular polariser. Because we are likely to be working with slower shutter speeds, a tripod will be essential to avoid camera shake. Although you have a polariser on your lens, you will also need to be able to emit light from a polarised light source. This may sound complicated, but there are two ways you can do this. The first method would require to purchase a sheet of

polarised film which you would place on a light source of white light such as a lightbox. You would place your plastic objects on top of that and then photograph the plastic objects with your camera with the circular polariser attached. Diagram 1 below, shows this particular setup. This is a great way to do it, although it does have a couple of drawbacks. Firstly, you may not have access to a lightbox, but you could always fashion one out of a cardboard box, a sheet of thin white paper and a desk lamp placed behind it. Secondly, the sheet of polarising film is not going to be that cheap as it is a specialist material. For a an A3 sheet, you could expect to pay around £90.



The cheapest plastic materials, such as these cups, cutlery and even a basic geometry set are the key to producing some amazing cross-polarised results.

Below is a diagram showing the basic cross-polarisation setup that uses polarising film and a source of white light, in this case, a lightbox.



An alternative

Happily, there is an alternative that does not require you to get your hands on a sheet of polarising film and a lightbox. You may not know it, but there are probably a few bits of tech in your house that emit polarised light. Various televisions, computer monitors, mobile phones and tablets have a sheet of polarising material built into their display. Be aware that not every device will have it. As an example, we have a TV in the kitchen that does not have this feature, but the TV in the lounge works perfectly, as does our mobile

phone, iPad, and computer monitors. This is a useful tip to remember as it means we have what we need for our shoot. So, here is our modified setup, using a TV to replace the lightbox and polarising sheet shown in diagram 2. The only thing you need to be able to do, is have a white image on the screen. On a computer, you can simply set your operating system's wallpaper background to white and use that. On a modern TV, you can display photos, so all you need is a jpeg of nothing but white and you can display that.

Diagram 2



Setting up

The setup can be as simple as you like. We've just placed a sheet of white Perspex by the TV screen and set the camera on its tripod in front of the that with the circular polariser on the lens. If you can, avoid placing objects right next to the screen as you may find you record the pixels of the TV screen and run the risk of creating a moiré pattern. Keep a little distance between the subject and the screen. Place your object and get it framed how you wish, then set your focus to manual and make sure the object is in focus. Try to black out the room if you can, or at least draw curtains to reduce the amount of ambient light.



Fade to black

Turn on your TV/monitor and make sure it is displaying a white screen. If you look through the viewfinder, you should see a rainbow pattern of colours on your plastic object. Now, while still looking through the viewfinder, slowly turn your circular polariser. You should see the white screen fade between white and black depending on how much you rotate the circular polariser [1-4]. Now you can choose a high-key look (white) or a more low key appearance (black). You may also see that as you rotate your filter and it fades to black, the colours appear more vibrant.

Exposure time

When you have the image as you want it, you'll need to dial in your camera settings. We shot on manual and arrived at a shutter speed of 0.6 sec, an aperture of f/10 and ISO 50. Be aware that if you shoot in auto on a predominantly white screen, your camera will probably try to underexpose the image, so you may need to add +1 to +2 stops of exposure compensation.

On a black screen, your camera will most likely attempt to overexpose by a similar amount. In this case you will need negative exposure compensation of about -1 to -2 stops. This is because your camera's meter will average the scene's brightness and try to expose it as near to middle grey as it can. Therefore predominantly bright/white images become underexposed as the camera tries to pull the exposure more towards mid-grey.

Similarly, dark/black images will be pushed more towards an exposure that matches mid-grey, resulting in overexposure. Keep an eye out for this, and compensate where necessary.



As you rotate your circular polariser, the white television screen will transition to complete black. The rainbow patterns revealed in the plastic will look even more pronounced.



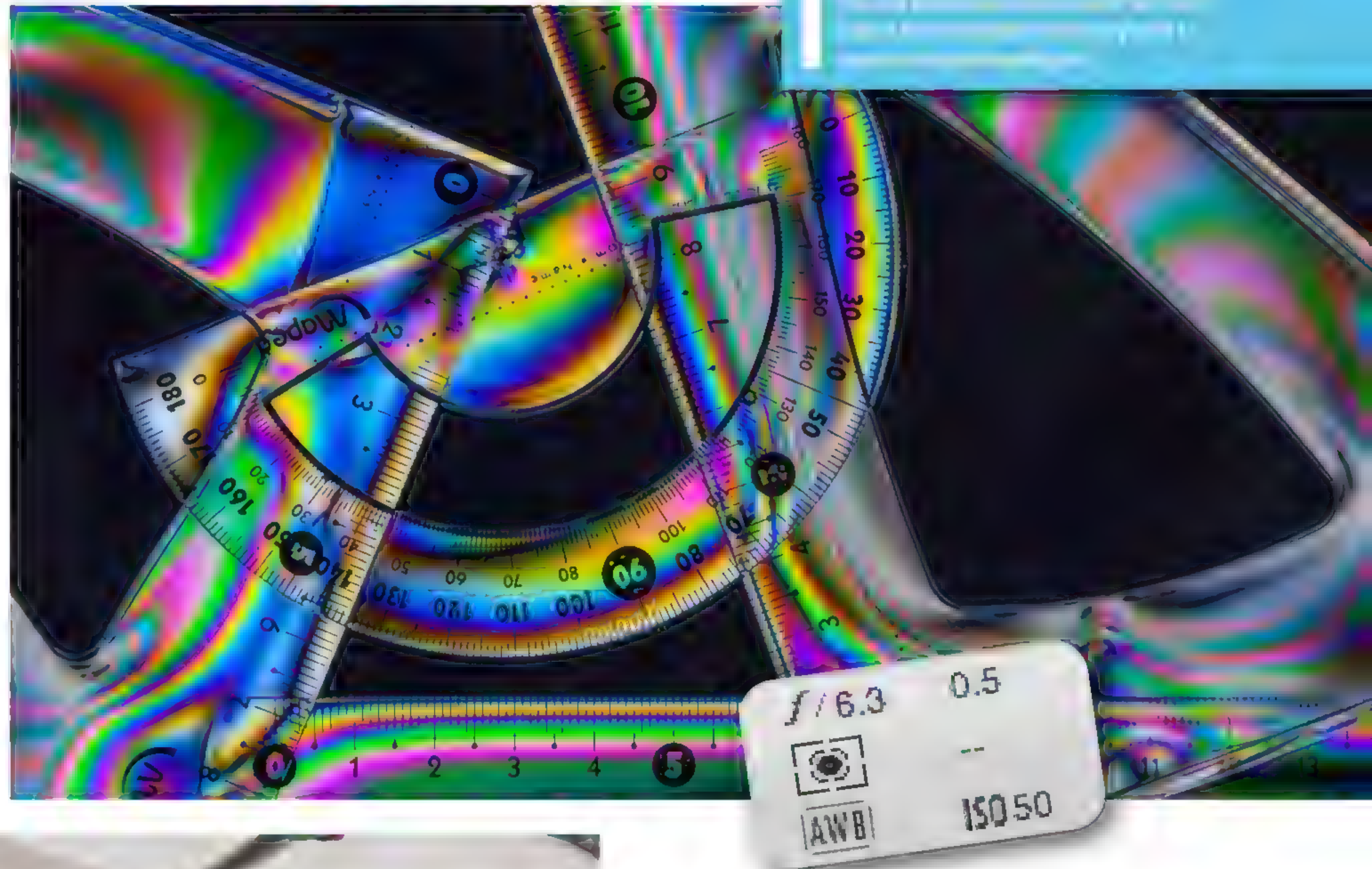
Now it's time to experiment with all the plastics you can lay your hands on. Remember, you can exaggerate some of the colour patterns in the plastic by bending or squeezing the material. You can also switch between shooting low-key images against black, or turn your polariser until the screen turns white for high-key shots.

Trip the plastic fantastic

All you need to do now is shoot away to your heart's content. Try different compositions and go as abstract as you like. You could even try stressing some of the plastic items by bending or squeezing them. This extra stressing should produce even more rainbow colour patterns dailling your psychedelic look all the way up to 11. As a little experiment, if you place a piece of good quality glass in the shot, you should see very little in the way of coloured stress patterns. This is why cheap plastic is the best choice for these shots.

One last setup

Whilst we had all the materials out. We did have a quick test to see what else worked as our polarised backlight. We had an old iPad and put some geometry equipment up on it and shot it from above. We set the screen to white as with the TV and got the camera's settings dialled in. We ended up using a shutter speed of 0.5 sec, an aperture of f/6.3 and ISO 50. The tablet worked great. We would have used a mobile phone too, but the screen was a little small for our plastic items.



At a push though, you could use it for a macro cross-polarised session.

Processing tweaks

Once the images were downloaded and the best ones picked out, all that was needed was to deepen the blacks and brighten the highlights. This produced some wonderful and vivid images. A small amount of cleaning up of the plastic in places to remove scratches, dirt, and dog hairs, and our images were ready to dazzle the world.

Off-camera flash

Set your flash and your creative vision free



If you have a flash in your camera setup, you have no doubt been enjoying the benefits of having an available light source when conditions demand it. You may discover there are times when you want a little more creative control over the end result. At the moment, your flash sits atop your camera providing one light source, perhaps with the option of bouncing it off a nearby wall or ceiling if you happen to be indoors so you can modify the light to soften the shadows. Anything is better than the direct flash rabbit-in-the-headlights look

right? This is great, bounce flash can create some lovely images. If you were outdoors though, trying to do a portrait, where would you bounce the flash? Options become limited, and you may have to resort to direct flash which can kill the mood of the shot. You want to be able to control the direction of light and create some highlights and shadows to add modelling and depth to the scene. This is the point where you would want to get your flash/strobe/Speedlite (whatever you want to call it) off your camera. But how do you do that?

“Although there are a bewildering variety of options out there, the truth of the matter is, you do have plenty of choice.”





Detaching the flash from your camera and still being able to control it from a distance is not as daunting a prospect as it might seem to the fledgling strobist. The basic methods you can use are:

Sync cords

A wired system of cables and adapters. Basically, this is an extension cable that connects one end to the hot-shoe of your camera and the other to your flash. You can use

multiple flashes if needs be, but it will require additional cabling, adapters and splitters. Also, with the correct cable, all the flash's original functions and things like eTTL metering and High Speed Sync will be preserved. The distance you can get between you and your remote flash is determined by the length of cables available. A standard off camera cord is usually about 1m. I have seen videos on YouTube where people buy several cables and hack them together. It can be no surprise that

the big manufacturers might possibly limit cable length because they most likely want you to go for a more expensive wireless system.

Optical triggers

These are very cheap to buy, simple to operate and readily available. In fact eBay is overflowing with cheap non name-brand camera accessories such as this. Simply put, it is a wireless system that uses optical triggering i.e. a trigger that attaches to your flash unit and will activate it remotely when it senses another flash (usually the one connected to your camera) firing. This does, of course require a second unit on your camera (or maybe attached to a sync cord) to 'pop' and fire the optical unit attached to your remote flash. When outdoors, the optical trigger may become erratic or, at worst, even useless depending on the power of your trigger flash and the prevailing lighting conditions.



Remote infra-red

A wireless system that makes use of infra-red signals from a sender unit to trigger a flash with a built-in IR receiver. IR is good for indoor use, but does need line-of-sight for the sender and all receiving flash units. IR setups are also infamous for erratic behaviour in bright, warm, sunlit conditions outdoors. The big name brands have their own native IR-based wireless systems but it does mean you are tied in to a specific manufacturer to match your camera system meaning that this type of setup can be quite expensive, particularly if you have to buy a sender unit to control the flashes. You may be lucky, however, as the newer batch of cameras on the market have wireless control built-in. Multiple flashes can readily be triggered with this system.

Wireless transceiver systems

A wireless system that uses 2.4GHz radio frequency from a transmitter to any number of receivers attached to flashes to trigger them. The latest crop of wireless systems are based on what

are called transceiver units. This means each trigger can be set to either send or receive a flash fire signal just by setting an appropriate option in a menu or by a flick of a switch on the unit. Once again, eBay has you covered for any number of cheap alternatives like Cactus V2's. You can pick up a Yongnuo RF 603 twin pack for about £30. If you are feeling a little more flush, then £300 will get you a pair of Pocket Wizard Plus III transceivers. I have to put my hand up and admit to getting a native brand wireless system for my Canon setup. It is an ST-E3 wireless transmitter and multiple Speedlite 600EX RT's.

All these systems, cheap or eye-wateringly expensive all benefit from not needing line-of-sight. You can have a flash in the next room and it will still get the signal to fire ok. They also have a good range and work equally well indoors or out. Bear in mind though that the cheaper units are cheap for a reason. Any flash connected to them will have to be controlled manually and individually. TTL metering is not available in cheaper units as well as High Speed Sync. Greater control of your flashes, such as

eTTL metering and even High Speed Sync (even something called HyperSync in top of the range models), along with advanced control of multiple groups of flashes, comes at a price.

Although there are a bewildering variety of options out there, the truth of the matter is, you do have plenty of choice and within a wide price range. You just need to assess how you want your equipment choices to work in your standard shooting environment. If you shoot lots of close-up portrait or macro work, then you don't necessarily need a high-cost wireless system that supports multiple flashes that can be operated from a large distance.

A wired, sync-cord approach, is a great way to start out. Besides, it is a useful accessory to have in your kit bag anyway. As with everything photographic, you always have the option to upgrade to other systems later if needs be. With the cord approach in particular, if you find yourself running out of hands to hold and operate flash and camera, consider a cheap light stand to perch your flash on while you are concentrating on shooting. ■

Yongnuo transceivers may not be the most feature-rich wireless system you'll ever come across, but they are cheap and an excellent choice for a first foray into creating a wireless light setup.



Pocket Wizards are a very popular choice for pro photographers. There are a number of systems to choose from and can run to very high prices, but you do get what you pay for.



The Canon 600EX-RT, a powerful flash that can be controlled by the ST-E3-RT. A wireless controller that can work with multiple groups of flashes up to 16 units at once.



SARAH-JANE GETS HER CLOSE-UP

Here is a typical use of off-camera flash. We were shooting at sunset, with the light behind us and off to the right. After getting the basic

ambient light exposure correct, we dialled in a two flash setup to light our model and balance her against the scene.



No flash

Camera settings - aperture f/5, shutter speed 1/160, ISO 100

In the first shot, we needed to dial in the camera settings without the flash. It was a case of getting a decent exposure of the background as the sun was setting behind the hills in the distance off to the right of the shot.

The end result has the sky and the sea correctly exposed but our model is not. Because Sarah-Jane is effectively backlit at this point, she is quite underexposed.



The shots of Sarah-Jane were taken using two flashes controlled by a wireless trigger. It is a great way of being able to keep mobile with your lighting rig, so you can move around easily if needed.



With a two flash setup

Camera settings - aperture f/5, shutter speed 1/160, ISO 100

Flash settings - x2 flashes at 1/2 power each.

Having got the camera settings set up correctly to record the background at the correct exposure, the next step was to light our subject. We used two flashes and a shoot-through brolly. The brolly is great for diffusing the light from the flashes. There wasn't necessarily any need for the use of two flashes. We only used two in this case so one flash needn't be fired at full



power all the time. After a little experimentation we arrived at our final set up with the flashes each at half power, about 5 feet from the subject. Now our shots look much more balanced and have more 'pop'. Our model stands out from the background now.

BLACK AND WHITE PHOTOGRAPHY

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See the world in black and white as we introduce you to this timeless medium. At the dawn of photography as we know it, when everything was fresh and new, you had no choice but to shoot in black and white. Exposing images onto glass or metal plates gave way to the film and chemical process. It wasn't until 1936 that Kodak gave the world colour photography. However, black and white photography didn't die off like the black and white TV; in fact it flourished.

Whichever way you look at it, colour distracts you from the heart of what should make a great photo. Things like texture, composition, form, lighting and good old storytelling can be swamped and made inconsequential by colour. It's not to say that colour is an invalid medium. Black and white photography can be seen as your interpretation of what is real, whereas colour can feel more like a record of reality. Shooting

in mono is a medium that adapts very well to any kind of lighting situation. A shot taken on a cloudy day in colour feels dull; the same shot in mono feels moody. A colour image can be said to shout at you for attention, whilst a mono image speaks to you quietly in a more personal way. In the past, shooting in black and white was not seen as a limitation of the technology at hand, more a creative choice. The popularity of the medium today would suggest many still feel that way.

That may all sound a bit mystical, but in essence, many photographers would argue that black and white is probably the purest form of photography. We could fill an entire book with the intricacies of the black and white art first pioneered by great artists such as Ansel Adams, David Bailey, Richard Avedon, Man Ray and Henri Cartier-Bresson, but there are some simple tips that can help you on your way to discovering why black and white photography is such a prized and creative visual medium. ■

“...black and white photography didn’t die off like the black and white TV; in fact it flourished.”

“Shape defines how an object looks in its simplest form, as an outline or silhouette only.”

Black and white core concepts

Begin to train yourself to ‘see’ in black and white

You would imagine that the starting point would be to grab your camera, set its functions to black and white mode and start shooting. Many photographers always shoot in colour, in order to maintain as much tonal variation in the Raw image as possible; it just gives you more data to play with when it comes to the conversion process. A key word in the last sentence was ‘Raw’. Always shoot in Raw format. You want to record as much scene data as you can without your camera trying to process the image for you. Although it might sound odd, you need to develop the ability to ‘see’ in black and white. A great visual aid is to shoot Raw, as we’ve

said, but also to set your camera’s picture style to black and white. It displays a black and white image on your LCD screen, but all the colour data is still there.

In its most basic form, a photo in black and white is made up of several components. Texture is a key ingredient; black and white loves texture. Harsh midday sun knocks everything flat, but the light glancing across a scene at sunrise or sunset makes texture pop out of the image.

Tonal contrast is another important consideration. A flat image with very little contrast will not necessarily convert into a great black and white shot without some serious post-processing; although in some cases, low contrast

images can be very visually appealing if done with care and attention.

Shape defines how an object looks in its simplest form, as an outline or silhouette only. Images based on shape alone can be graphically intense. Form shows how something has depth and dimension. How an object is lit and casts shadows within its environment is the key to showing its form.

So, we have introduced you to some of the core concepts of black and white. Now, let’s explore it in more detail. The following pages will guide you through the rich, creative techniques that will enable you to explore and enjoy the world of black and white. ■





The shots shown here are not dependent on the inclusion of colour. The shapes, forms and textures are the key visual stimulants that draw the eye.

Seeing in black and white

A quick and simple method to get your eyes used to seeing in black and white

Although we will be talking about how to train your mind's eye to see the black and white potential of the colour world around us unaided, there is a great method that helps to kick things off and give you some rapid feedback on how your image might look in black and white.

The current crop of point and shoot cameras and the more advanced DSLR's have the facility to record images in black and white. A lot of them even have the ability to add effects and styles to the images before they even get to your computer. We want to concentrate on the very simple setting that basically turns your device into a black and white camera with the option to add simulated colour filters to affect the

tones in your shot. The menu structure may differ from camera to camera, but it is usually found under the Picture Styles tab or similar.

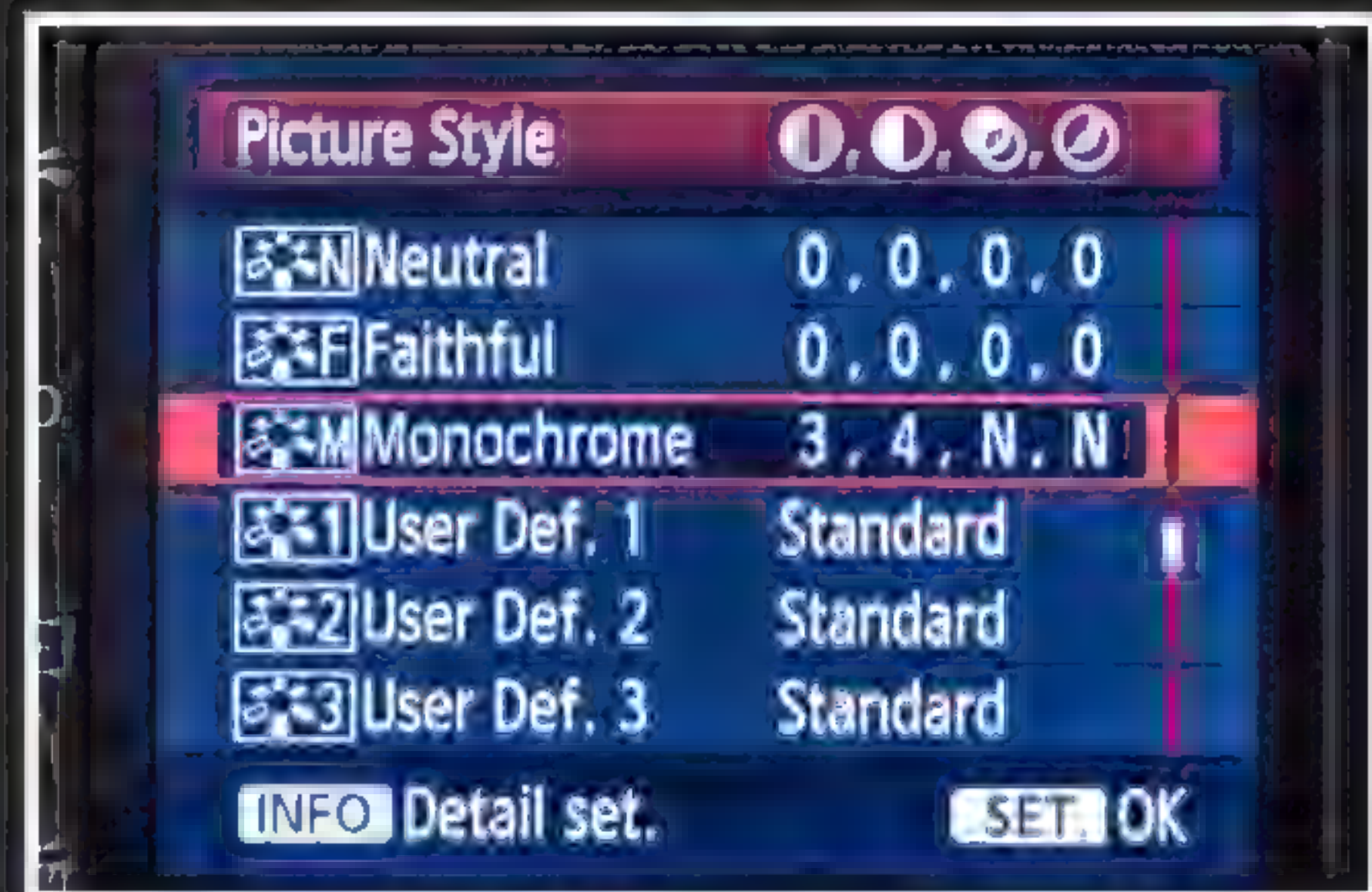
The great thing is, you can still shoot Raw images that you can edit in colour, but because you are in monochrome picture style mode, your camera's LCD screen will show the image in black and white. You could even decide to shoot in Raw and Jpeg formats at the same time. The Raw file will keep the colour data for further editing, and the Jpeg will be a processed black and white image. Either way, you have an original where the colour is retained.

Now you can go out and shoot and see immediately if an image has black and white potential and is worth holding on to. ■

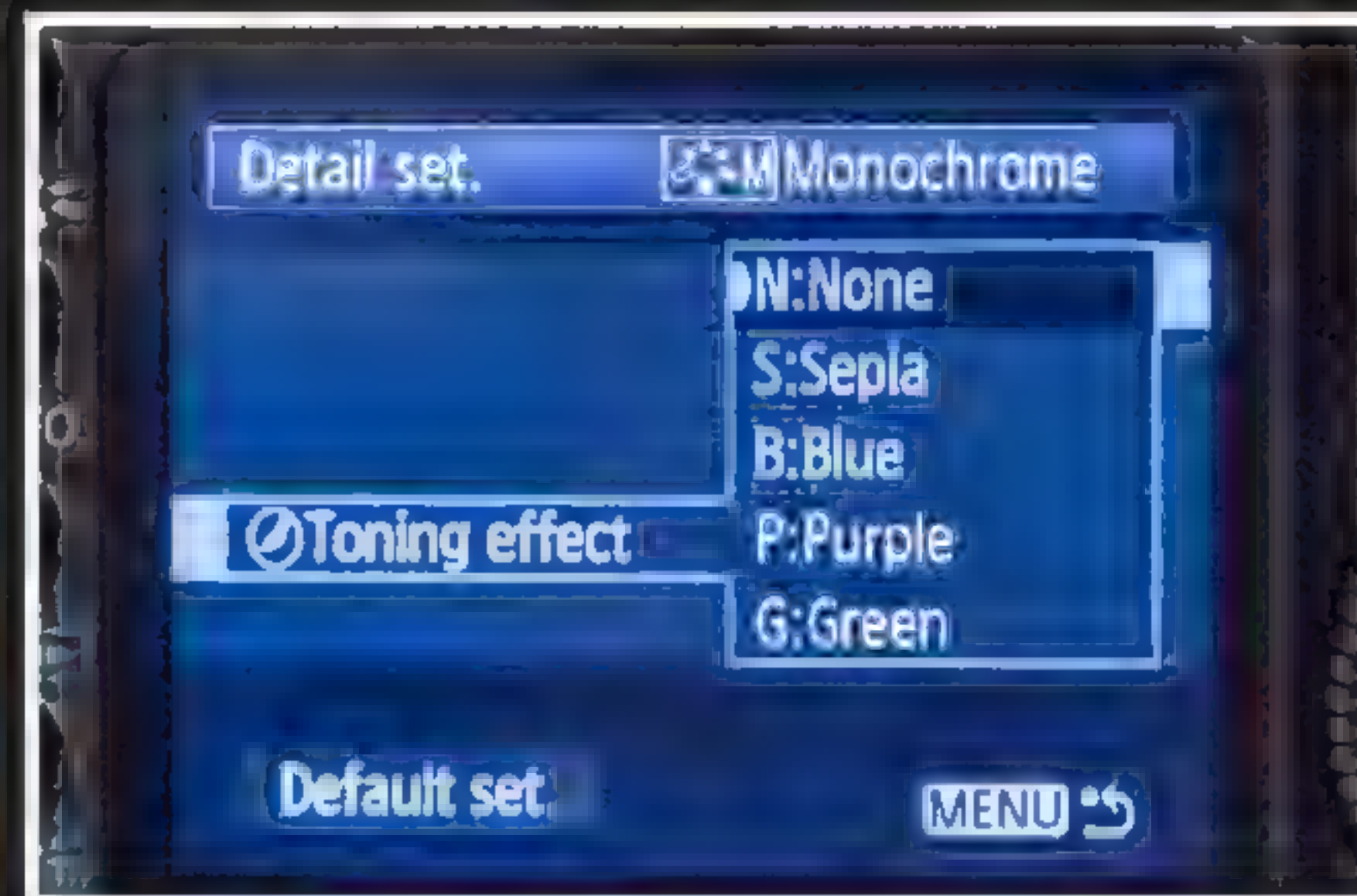
Shooting in Raw format and setting your camera's picture style to monochrome means you can shoot and review your images straight away in black and white, but because they are in Raw format, the original colour data is not lost. When you come to process your images, you'll have as much data to work with as is possible.



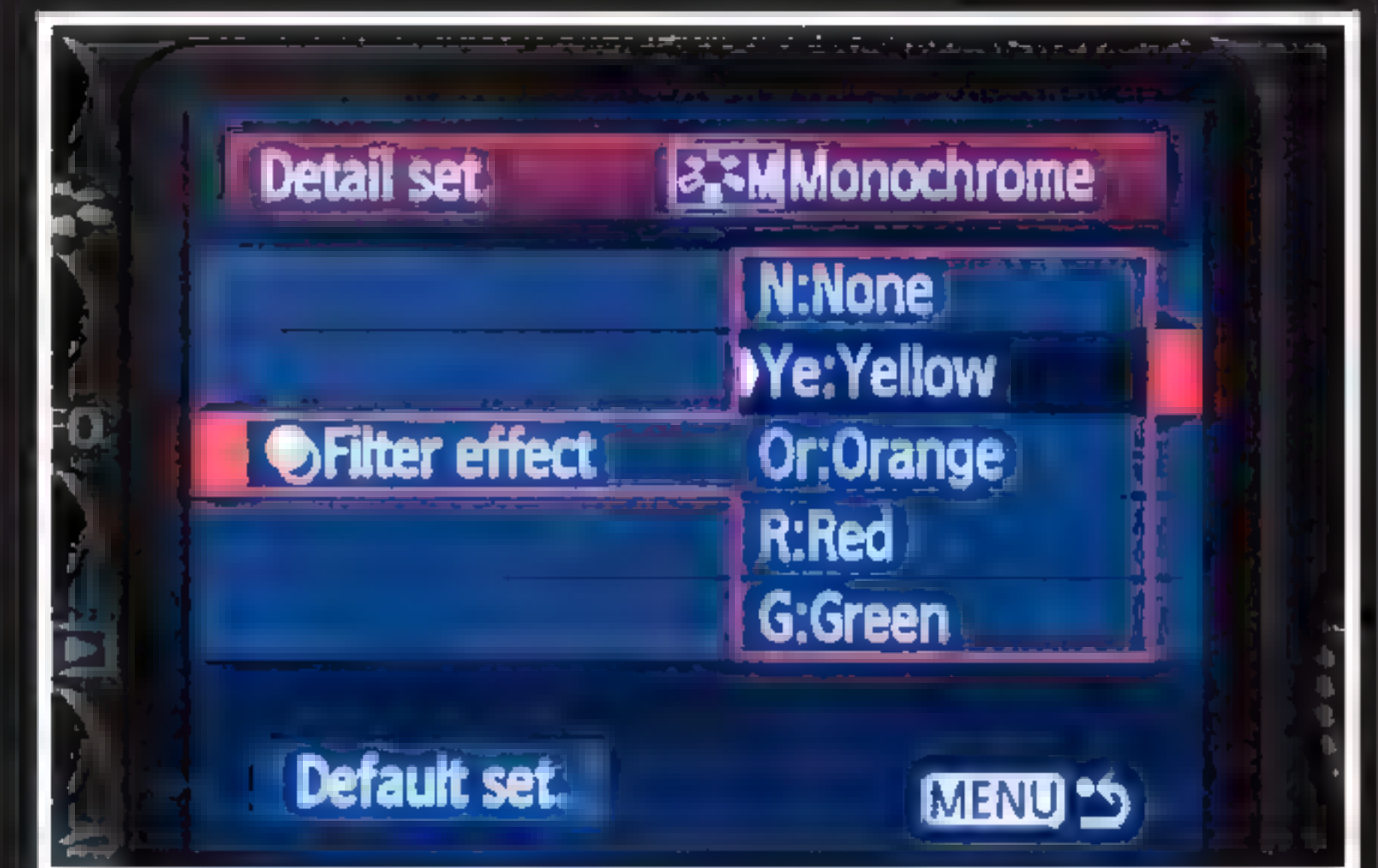
“The great thing is, you can still shoot Raw images that you can edit in colour, but your camera’s LCD screen will show the image in black and white.”



In our example, we are showing screens from a Canon EOS 5DMK2, although menus may differ; most digital cameras offer the facility to shoot and display monochrome images, but still capture a Raw file that you can process fully later in either colour or black and white.



When shooting in the monochrome picture style, you also have the option to add either filter or toning effects. The filter effect simulate the use of real-world coloured filters and the toning effects will tint your images in a number of preset colours from sepia to purple, to green.



Under filter effects, you can choose from yellow, orange, red and green filters. They all will have a subtle effect on the monochrome image that is recorded. For example, a bright blue sky, shot in monochrome with a red filter, will be noticeably darker than if the filter were not applied.

Below are some examples of the monochrome picture styles available to the Canon 5DMK2. The camera was set up to shoot one editable Raw file as well as a fully processed Jpeg, which had the particular effect permanently applied at the time of shooting.



Original colour version from the Raw file.



Monochrome with Green filter applied.



Monochrome with Red filter applied.



Sepia toning effect applied.



Blue toning effect applied.



Green toning effect applied.

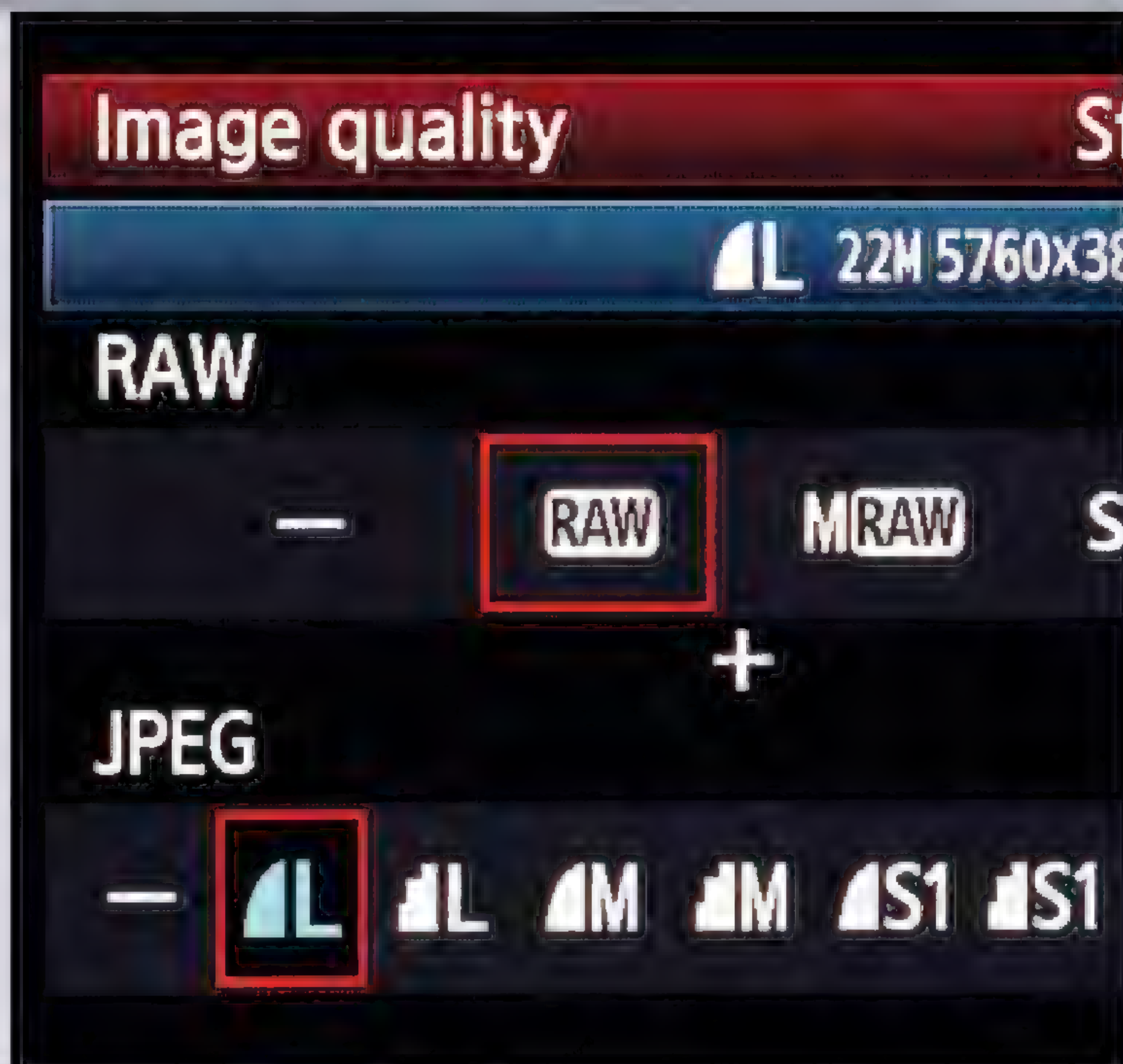
Black and white shooting guide

Some essential tips for better black and white photography

1

Shoot in colour and in Raw

A lot of modern cameras have so-called creative functions that give you the option to capture your images in black and white at the outset. Doing this may actually result in a loss of tonal range. If you shoot in colour and especially in Raw format, you will be capturing the full gamut of tonality that your camera's sensor can see. This is a much better starting point with more control than an in-camera mono image. It won't stop you if your camera can't shoot Raw, and you have to use jpegs instead; just keep them in colour.



2

Compose yourself

The basic rules of thumb that apply to general colour photography also apply to black and white. The rule of thirds, golden ratio, leading lines, framing and viewpoint are all well established guidelines that can make even the simplest scene stronger with some care and attention given to the composition of the final shot. Now, having said that, sometimes rules can be broken. If you find your scene somehow doesn't conform to a standard rule, take the shot anyway. Now and again it's refreshing to shoot something 'just because...!'



3

The best conditions to shoot

The truth is, there aren't necessarily any best conditions in which to shoot black and white. Some mono shooters actually prefer to take their shots on overcast and generally dark days. The low contrast seems to be a draw for these photographers. Certainly, a grey cloudy sky can be made to look very moody and dramatic, as opposed to a blue sky with white puffy clouds. A lot of it will come down to your personal preference and mono conversion technique. However, just because it's overcast it doesn't mean there aren't any interesting image possibilities out there.



4

Lighting in your scene

Your image can stand or fall on the quality of the light in the scene. It is generally held that midday sunlight knocks detail flat and creative possibilities are more limited. For landscapes particularly, the first light of morning or the last light of evening is a much more prized commodity. Light glancing across the land picks out details, throws long dramatic shadows and enhances contrast. You can use this great light for mood and drama that is absent when the sun is at its zenith.



Black and white shooting guide

5

Consider your subject

Trying to think in black and white - that is to say, trying to visualise the scene in front of you with all its colour absent - is a good skill to try and develop. The simple question you have to ask yourself at the outset is whether the resulting image would be improved by being in black and white, or whether colour would be the best thing for it. Not every image will work in black and white. Sometimes the removal of colour can also remove differentiation between objects that could easily be distinguished were they in colour.

Original shot on a cloudy day.



The conversion reveals drama in the sky.



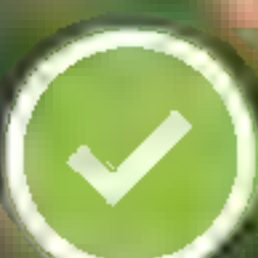
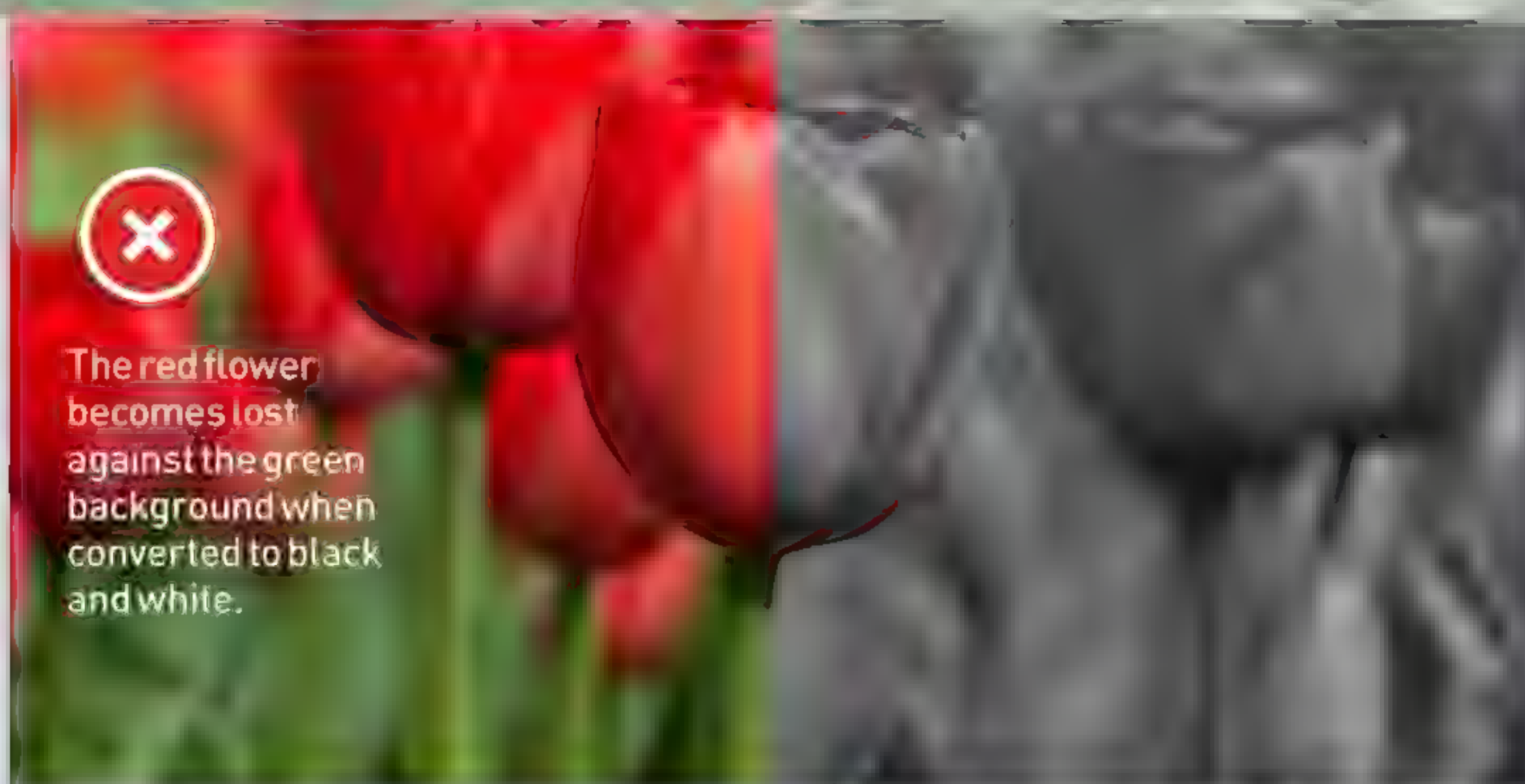
6

Colour and contrast

You'd imagine that your black and white image doesn't rely on colour or great weather for the image to be successful, although you need to be keenly aware of the differences between colour values in your objects so that they still have some distinct separation, and can be differentiated when converted. A red flower against a green background may work well in colour but in black and white the tones can look very similar, and suddenly your flower is lost against the background.



The red flower becomes lost against the green background when converted to black and white.



A purple flower converts well into black and white and remains well defined against the background.



7

Look for shape and form

In black and white particularly, shape and form become very important to the success of the image. Converting to black and white means you can no longer rely on any colours in the scene to define or differentiate your subject from its environment. You need to be able to take the shapes, lines and forms available in the shot, and use them as the method by which the image is given an obvious focal point or object of interest.



8

Watch the skies

Be aware that grey overcast days can produce some spectacular moody shots. However, watch out for skies that are one single tone of grey with no cloud formations showing. When converted, this will make for a fairly boring looking sky with no real texture or interest. True, you could break out the image editing software and drop in a new sky, but try to keep as much of the final image 'in camera' as you can.





Below is the high-key lighting setup used to create this portrait of local musician Jess (left). It was compact enough to set up in a lounge. Lots of power was used to keep the background over-exposed and to begin to wash out some detail.

Canon 5DMK2 - EF24-105mm f/4
f/6.3 - 1/160 - ISO 100



High-key portraiture

We give you the low-down on high-key lighting for portraits

High-key lighting was originally developed for the film and television industry back in the days when the available technology was not capable of capturing high contrast ratios. A scene that had a large range of tones from deepest black to brightest white would have been impossible to capture with old technology. So, they came up with the high-key lighting system.

The idea is that increased lighting reduces the range of tones between black and white, or eliminates the darkest shadows altogether,

making it easier to capture and display those tones that are in the image. Simply put, black and dark tones are reduced, mid-tone areas become much brighter, and bright and near-white areas are pushed to white. Over time, though, it has become a stylistic and creative option for filmmakers and photographers alike. Many modern studios will shoot this kind of imagery for family and portrait work as it is considered quite contemporary, upbeat and light-hearted.

If you are shooting indoors, the amount of light and general lack of shadows mean that once

lights are in place, your subject is not tied down to maintaining one position. They can move around and still be awash with light from all sides. High-key images are also considered very appealing. Images with a larger amount of pale or bright tones are seen as positive, fun and generally attractive. The brighter nature of the shots is also flattering. The removal of shadows and a certain amount of reduced detail can improve a portrait. The further addition of presenting the images in black and white, where the possible confusion of colour has been removed, is also very effective. ■



“The removal of shadows and a certain amount of reduced detail can improve a portrait.”

“What constitutes a high-key image appears to be a matter of some creative debate.”

High-key portraiture

The great debate: what is a high-key image?

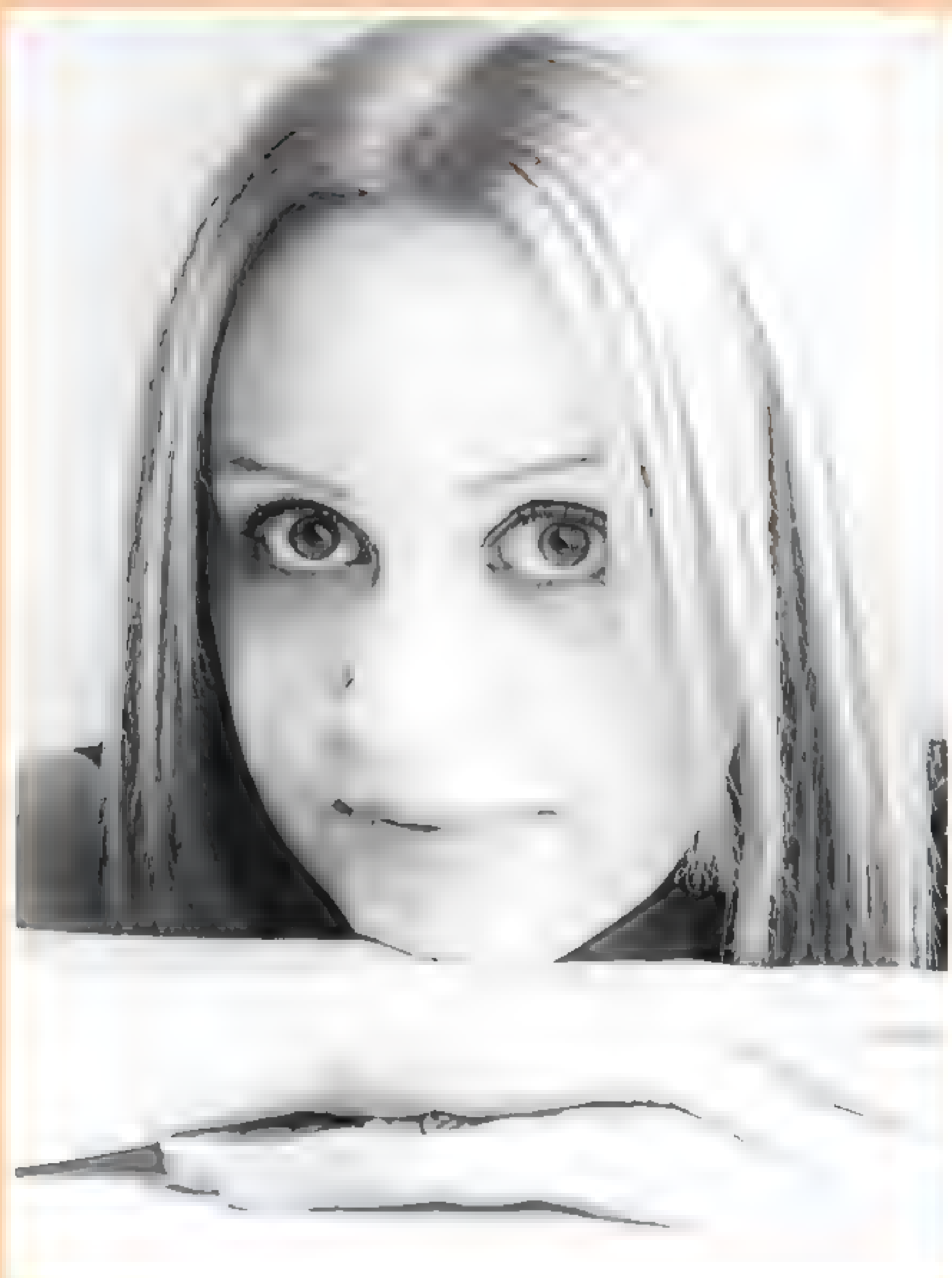
What constitutes a high-key image appears to be a matter of some creative debate. It is held by artists in some areas, who declare that a high-key image should not contain deep shadows and have limited areas of dark tones: essentially, a low contrast image. Some will say that a generally well exposed mid-tone subject, with a pure white background, constitutes a high-key photo. Still more will take the image to extreme levels of overexposure, with much detail being lost in the process, to leave the barest amount of detail and tonal range.

A general rule is that a high-key image when viewed as a histogram, either on your camera's LCD display or within your favourite Raw processing application, has its average tones to

the far right of the histogram. The further to the right, the brighter the image. It is often referred to as 'shooting to the right'. This is done as a result of either deliberate overexposure of an already bright scene at the shooting stage, or lighting the scene in order to achieve a histogram pushed to the far right. Your approach to shooting and lighting high-key may develop over time, but 'shooting to the right' can be a good starting reference.

High-key photography is not always something that can be done well with post-processing alone. Solid lighting elements in the original shooting setup have to be in place to ensure a well-balanced high-key image. If the image you shoot is not lit correctly, you may not be able to process your way out of the problem, so this

is something to bear in mind. You have plenty of light falling on your scene, but you need to make sure your exposures are set to get the brightest areas pushed as close to absolute white as you can, even going into overexposure to keep the greatest ratio of tones in the mid-tone and lighter areas. Shadows, although you can have them, are as minimal as possible. Make sure that you also shoot with as low an ISO setting on your camera as possible. This gives you some processing overhead if you find you do need to do some heavy tweaking of your images after the shooting stage. Given the amount of light you are employing in your shots, fast shutter speeds should be no problem to achieve. Depth of field and aperture are creative choices, but you may be limited by the sync speeds your camera and flash can achieve. ■





Courtney and Jamie pose for a typical high-key photo. The lighting and subsequent mono conversion were all geared towards the reduction of as much detail as possible, without destroying the structure of the shot.

Canon 1DSMK3
EF24-105mm f/4
f/6.3 - 1/160-ISO 160



Baby portraits are a popular subject for high-key photography. The overexposed images remove certain details, leaving the eyes, nose and mouth as the main points of interest. This shot of Isabelle used a three point setup to pour enough light onto the scene.

Canon 5DMK2 - EF24-105mm f/4
f/6.3 - 1/160 - ISO 50

The clothing you wear for a high-key will obviously have an impact on the final result when seen in mono. In the case of Dom here, he wore a white t-shirt which had a lot of its detail reduced when lit by two key lights.

Canon 5DMK2 - EF24-105mm f/4
f/7.1 - 1/160 - ISO 100

“...with low-key you often need only one light to get a great dramatic portrait.”

Low-key portraiture

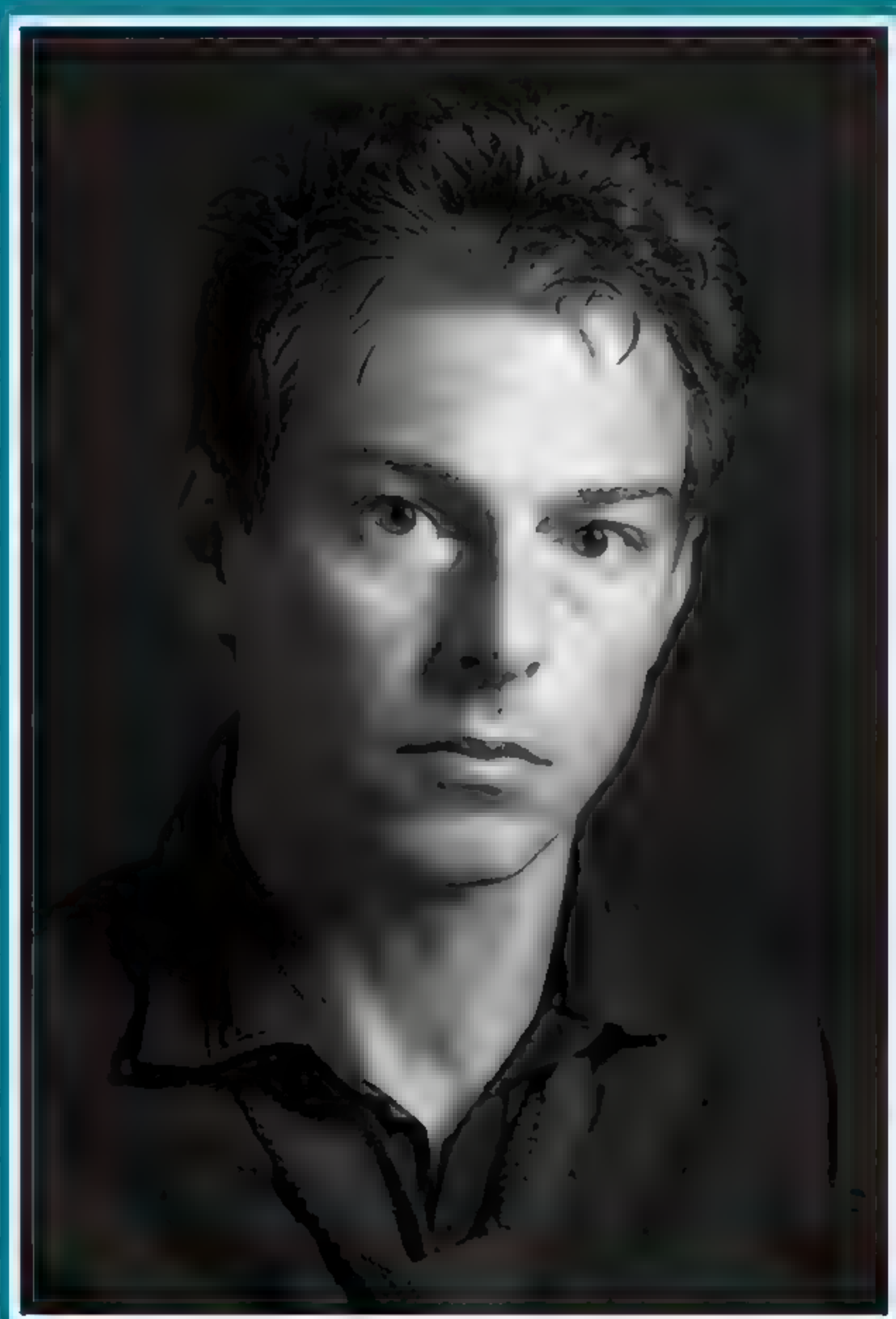
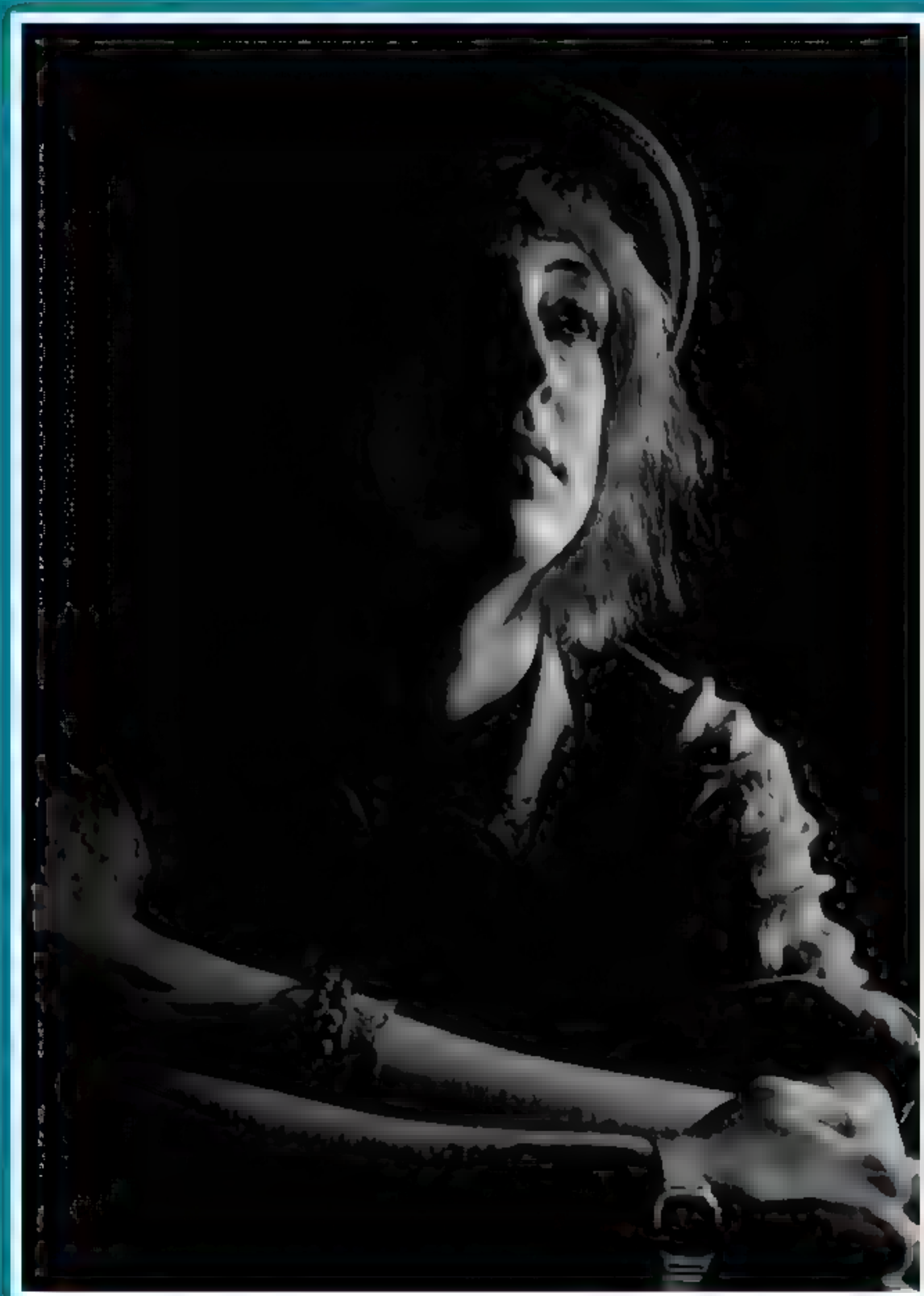
Welcome to the dark side with low key lighting for portraits

Low-key lighting is widely used in all the various visual media such as film, television and photography. It is used to add drama to a scene or image. Its mood is generally the complete opposite of high-key. It is dark, brooding, mysterious, and dramatic. Low-key is also a simpler setup than its counterpart. You are often using three or more lights for high-key work; but with low-key you often need only one light to get a great dramatic portrait. An absence of light is what is needed here, with just your subject illuminated, creating high contrast images.

Shooting with one light in a dark setting also means you can shoot in locations that would normally be no good for any other kind of lighting. Because your subject is essentially the only thing in the scene that is lit, you can shoot in your own front room if you want to, without the need for large studio space, providing you don't need to shoot very wide and your flash is not reflecting off anything that might show up in the final image. A large black sheet as a backdrop is one additional item that will help eliminate any parts of your home showing in the shot. You can just keep your flash power

low, move it in close to your subject, and shoot away to your heart's content.

It is not unheard of for photographers to shoot low-key images in daytime outdoor locations such as car parks. It then becomes a case of having enough space in which to work with no distracting objects nearby. You'll have to use camera settings that, on their own, render the scene black; then introduce a light source very close to the subject at sufficient power to provide enough illumination for them to be seen in the shot, but not spill onto anything else in the immediate vicinity. ■





This low-key image of was lit by a single light to camera left and behind the model. This creates what is know as rim lighting, with just a very small area lit by the flash. The rest of the scene is in near darkness and makes for a very dramatic image.

Low-key portraiture

Some key insights on shooting low-key portraits

High key photography is seen as the process of 'shooting to the right', where all the brightest tones are packed on the far right of the histogram. Low-key, as you might imagine, is the reverse of that. A proper low-key shot will have the majority of the tones in the histogram far to the left, even to the point where shadows are 'clipped' and therefore totally black. It is perfectly suited to being converted to black and white, often looking more striking than its colour counterpart. Bear in mind that, although you are capturing a predominantly dark image, it is how you control those tones that will create a striking and memorable low-key image. Because you are normally using

a one light setup, it is easy to keep moving the light around.

As a start experiment with the placement of the light, choose a subject and space the light to your favour. The light that hits your subject's face is more likely to be the key light, and it is here that you must be judicious. The light that you use to create the key light should be positioned to create a strong, directional light that will create a strong, directional light that will create a strong, directional light.

Just as with high-key photography, low-key photography is a process of control. The light that you use to create the key light should be positioned to create a strong, directional light that will create a strong, directional light that will create a strong, directional light. The light that you use to create the key light should be positioned to create a strong, directional light that will create a strong, directional light that will create a strong, directional light.

controlling any amount of light that you use. The light that you use to create the key light should be positioned to create a strong, directional light that will create a strong, directional light that will create a strong, directional light. The light that you use to create the key light should be positioned to create a strong, directional light that will create a strong, directional light that will create a strong, directional light. The light that you use to create the key light should be positioned to create a strong, directional light that will create a strong, directional light that will create a strong, directional light.



This cross lit image of Sarah-Jane was tonally quite neutral. A strong black and white conversion was able to boost the black and intensify the lightest areas. We finally ended up with a great low-key result.

Canon 5DMK2 - EF24-105mm f/4
f/6.3 - 1/160 - ISO 50

“It is perfectly suited to being converted to black and white, often looking more striking than its colour counterpart.”



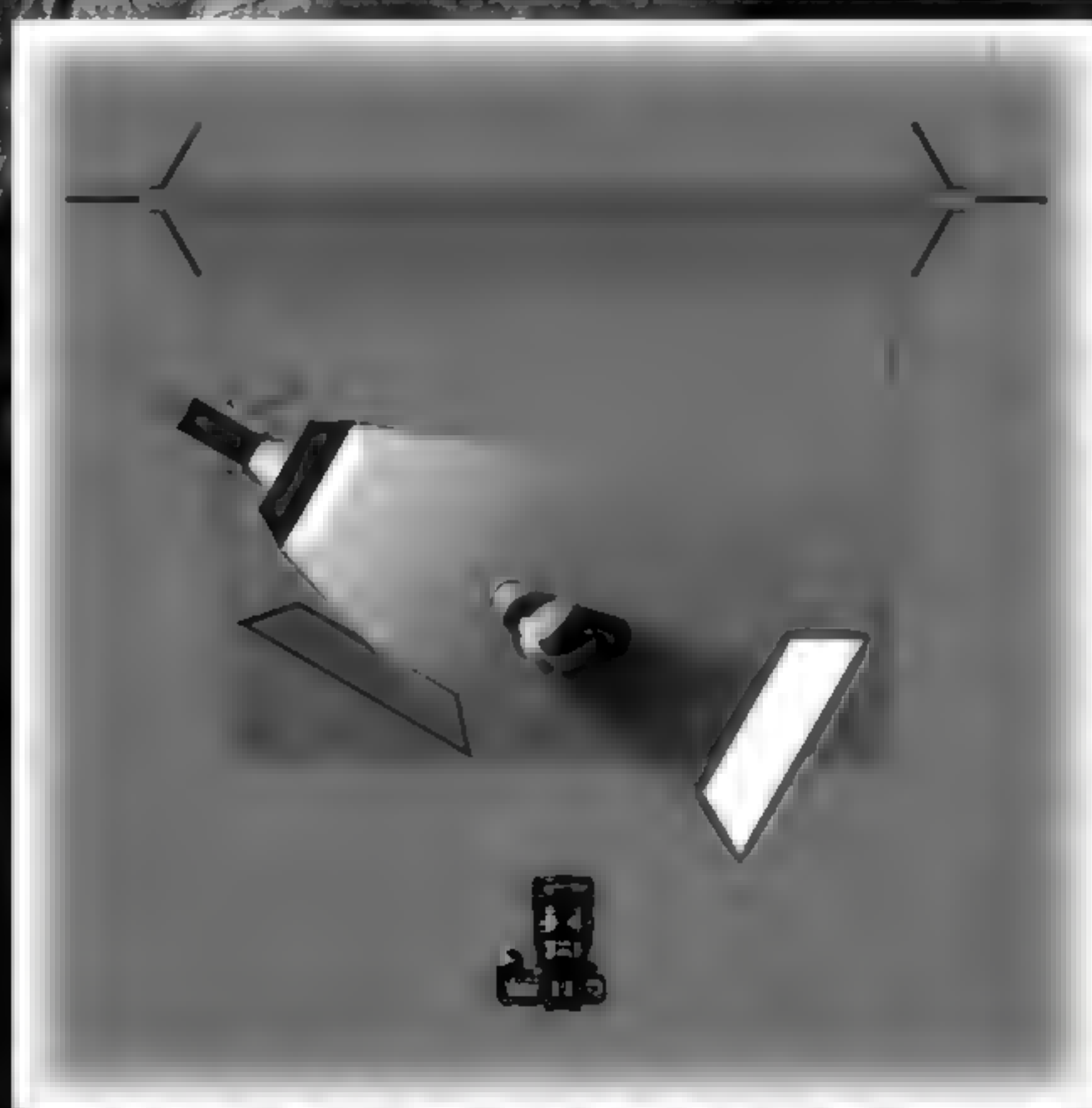
Another rim lighting shot of Dave whilst he is smoking. As well as rim lighting his face, it also illuminates the smoke of the cigarette, creating a very film noir feel to the final image once converted to black and white.

Canon 1DSMK3 - EF50mm f/1.4
f/2.8 - 1/160 - ISO 50



This image was aided in becoming a low-key shot by the use of dark clothing as well as the lighting setup. Jamie was lit with a large scrim camera right with a low power fill light set up behind him to camera left.

Canon 5DMK2 - EF24-105mm f4
f/7.1 - 1/160 - ISO 100



Jess was lit using a cross light setup. The high power key light was placed camera left to create a strong side light on her left, and the fill light was positioned camera right and in front to fill in any hard shadows. It was then converted using Silver Efex Pro and the blacks were boosted to keep the mood dark.

Canon 5DMK2 - EF24-105mm f/4
f/6.3 - 1/160 - ISO 50

LANDSCAPE PHOTOGRAPHY

There's more to a landscape than you might imagine

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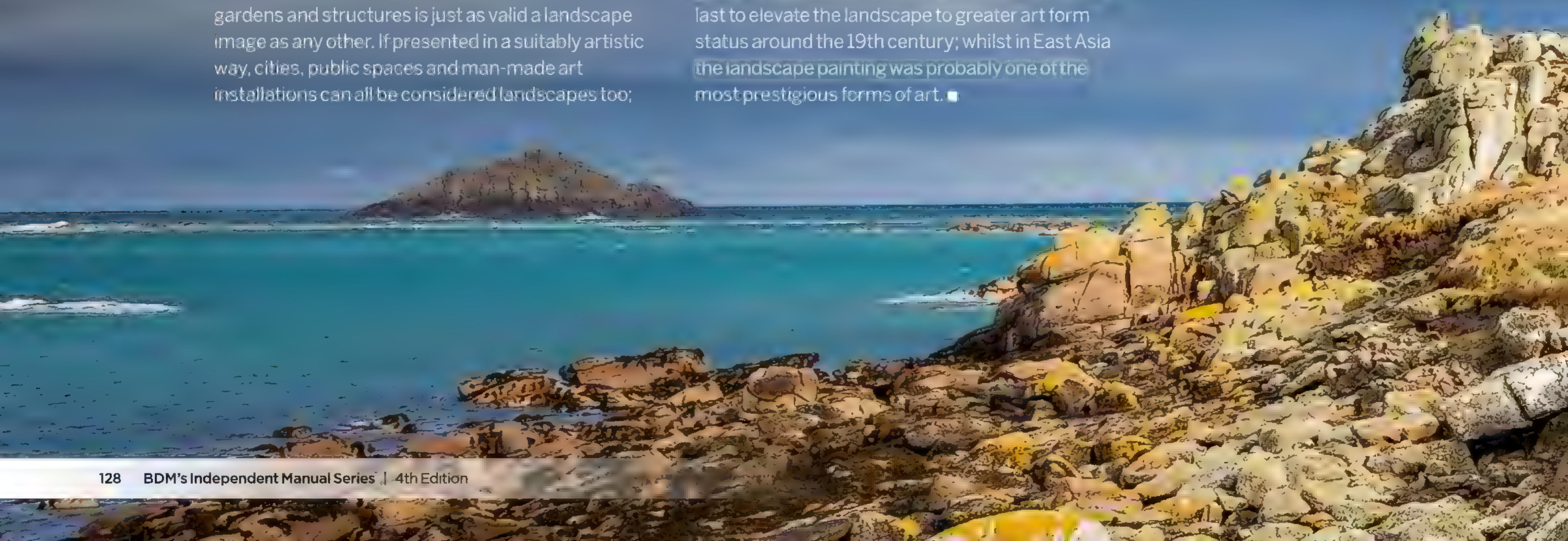
158 - 161 Sunrise and sunset

What is landscape photography? This is a more complex question than you might at first assume. There are numerous definitions out there that try to sum up what landscape photography actually is. It can range from such matter-of-fact definitions as: "The dominant use of the term is in reference to photography of naturally occurring scenery in open spaces" to a more simple and broader: "Photographs taken outside".

Many regard a landscape to be a representation of a place that has little or preferably no sign of human activity. It is meant to be an untouched and pure depiction of nature. For others the inclusion of man-made objects that range from walls, fields, gardens and structures is just as valid a landscape image as any other. If presented in a suitably artistic way, cities, public spaces and man-made art installations can all be considered landscapes too;

more appropriately they are called 'cityscapes'. These days it seems that there aren't any outdoor places, natural or not, that cannot be considered as a potential landscape. The landscape is in the eye of the beholder.

Long before photographic techniques had been invented, landscape paintings were very simple affairs; in fact the earliest forms of art around the world would show very little that could be construed as a landscape. Only the very simplest indications of a horizon line and perhaps trees and mountains are all you would be likely to see. As art forms developed though, the representation of the natural world became a much more accepted genre. Oddly it was the western world that was the last to elevate the landscape to greater art form status around the 19th century; whilst in East Asia the landscape painting was probably one of the most prestigious forms of art. ■



“Many regard a landscape to be a representation of a place that has little or preferably no sign of human activity. It is meant to be an untouched and pure depiction of nature.”



Landscape photography tips

A guide to getting the most from your landscape photography

For many people new to the world of photography, one of the easiest and most accessible areas first explored is the great outdoors and why not? You don't need a studio or masses of expensive equipment. There is plenty of available light, unless you're feeling adventurous and want to try night photography and beautiful seaside or countryside scenes are usually not too far away by car or a brisk walk.

Landscape photography is an amazing and rewarding experience for both novice and seasoned professional. Whether it's just a record of a day trip you've made to a new location with the family or a more serious professional

endeavour, landscape photography can be a rewarding experience. It's a chance to capture the beauty of the world around us and to share it with others. Even if you're just a beginner, there are many things you can do to improve your landscape photography. First, you need to have a good camera. A DSLR or mirrorless camera with a good lens is essential. Next, you need to have a good eye for composition. This means knowing when to take a shot and how to frame it. Finally, you need to have a good understanding of light. This means knowing when the light is best for your subject and how to use it to your advantage. Ansel Adams, a master of landscape photography, once said, "The camera is a tool, but it is the photographer who makes the difference." So, if you want to take your landscape photography to the next level, you need to focus on these three things: camera, composition, and light.



“Landscape photography is an amazing and rewarding experience for both novice and seasoned professional.”

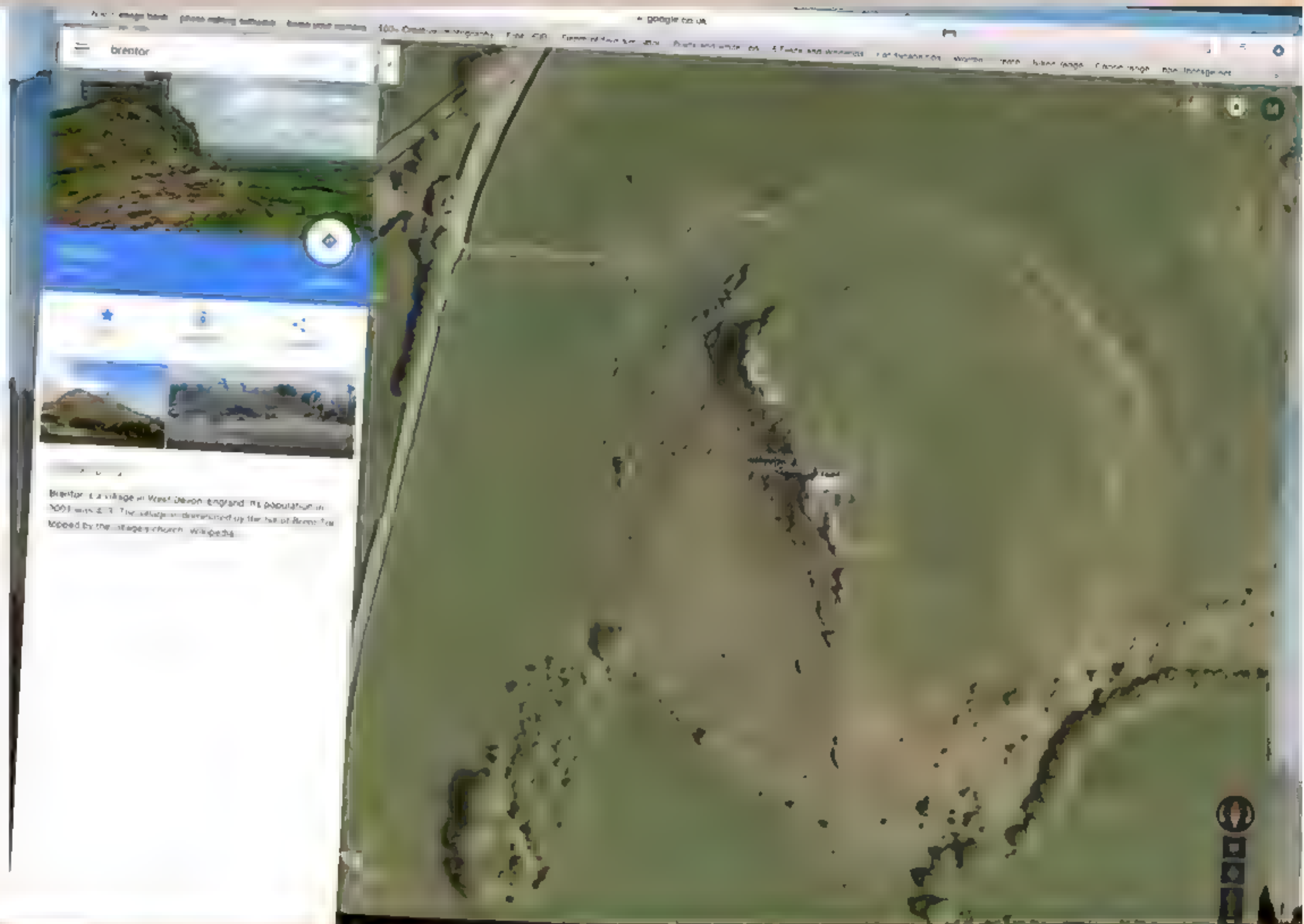


Landscape photography tips

1

Research your location

Take time to research your possible shooting destination if you have not been there before. Just Googling the location you want to shoot will call up all sorts of information. Most of it may be useless to you but you can guarantee that there will be examples of other photographs taken there. The experiences of other photographers in this location will give you the heads-up as to whether it is an easy or difficult place to reach. There may be tips concerning local by-laws and the best nearby parking spots etc.



2

There's an app for that

There are apps available that can tell you where the sun will be at any point on any given day. These apps can overlay information on a map of your given destination, showing where the sun will rise and fall and where it will track through the sky on whichever day you choose. This is great for working out what time is best for you to shoot in the location you are researching. Sunseeker for iOS and Sun Surveyor for Android are two great examples of these types of app.



3

Be prepared

Make sure you dress for the conditions you are shooting in. If you are going to be on rough terrain, then sturdy shoes are essential. A sprained ankle miles from anywhere, could be very unpleasant. Travel light if possible and the purchase of a good quality rucksack or rough terrain camera bag will stand you in good stead for your journey. Make sure someone knows you are out there and that you have your phone with you at all times. You never know.



10

A golden rule

It can't be stressed enough, if you want the best from your shots, you need to switch to Raw shooting mode. Most modern cameras now allow you to capture your images in Raw format. Raw as the name suggests is the uncompressed and unprocessed image data straight from the camera's sensor. The files are much bigger than their jpeg counterpart but they give much greater latitude when it comes to processing your final image.



11

Filter systems

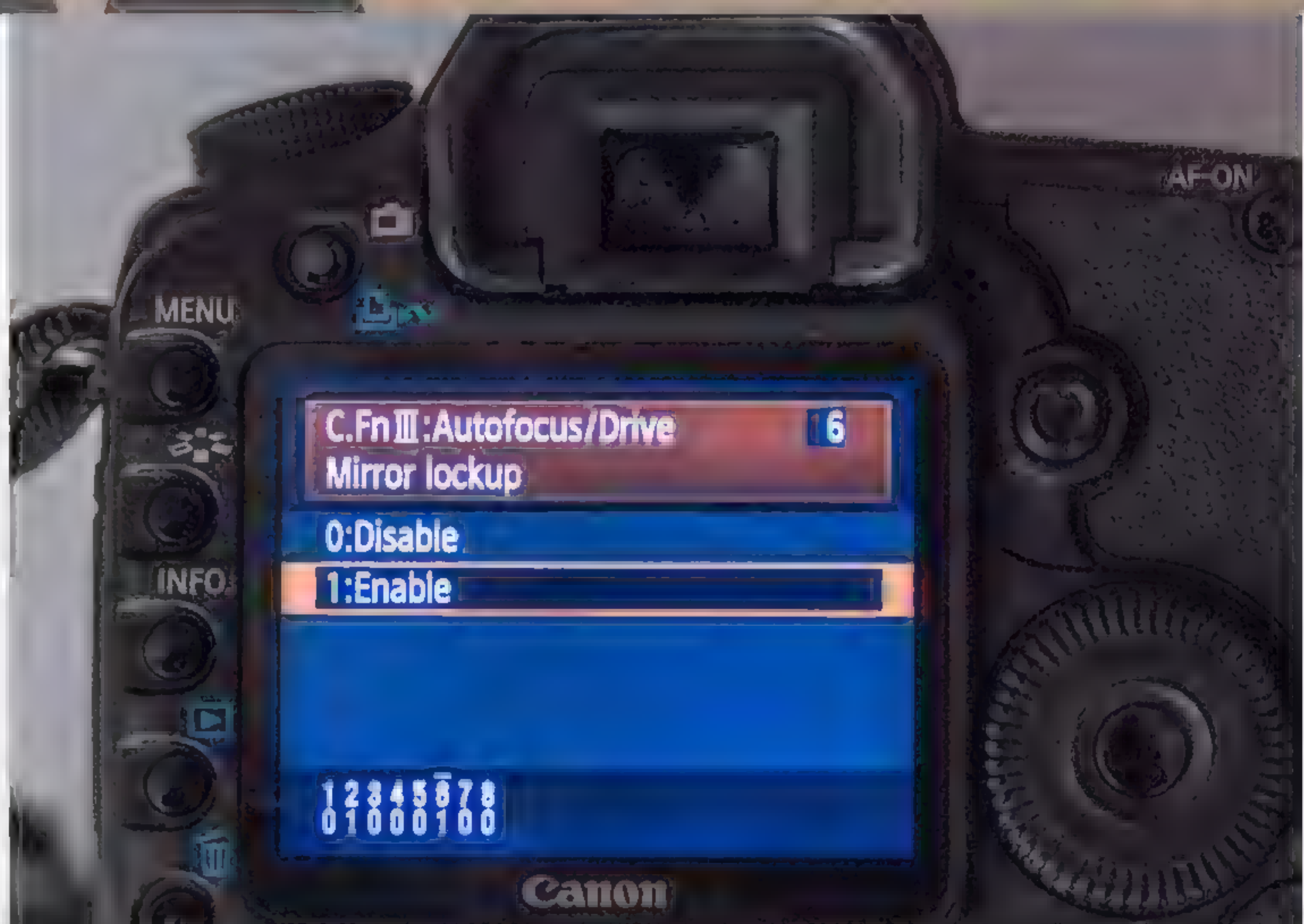
Think about investing in some filters. A circular polariser is very useful. It can boost the contrast in blue skies and is very useful for reducing or even eliminating reflections in water; just be aware that polarisers work best when the sun is at 90° to you. If you are shooting a scene where there is a large difference in the tonal values between your land and a bright sky, an ND grad will help stop those skies from burning out.



18

Lock it up

For extra tripod stability, a lot of photographers hang their camera bags underneath the head of the tripod to act as a counterweight, helping to immobilise the tripod. In addition, even the movement of your camera's mirror flipping up and down with each shot can create vibrations that affect a shot's sharpness. If you set your camera for mirror lock-up, it will flip the mirror out of the way long before the shutter opens to take the shot, giving time for any vibrations to cease.



Landscape photography tips

7

Light fantastic

In photography you may hear reference to 'the golden hour'. For gorgeous landscapes you cannot do better than to shoot at sunrise and for an hour or so after that; or at sunset and the hour or so before it sets. The light has a luminous warm glow, shadows are long and show off the contours of the land. The sky ignites in pink, orange and red hues and if you catch a sunrise or sunset with an interesting set of cloud formations, then all the better.



8

Blue hour

There is also what is referred to as 'the blue hour'. This is the twilight period you experience at either end of the day when the sun is a fair distance below the horizon but its influence can be seen in the sky. It is ideal for cityscapes where you can capture the city lights against a deep, inky blue sky. The window of opportunity is relatively small before either the sun rises and lights the sky or it sinks and renders the sky black. It usually lasts about 45 minutes after the sun has set or before it rises.



9

Stable conditions

A tripod is a must for landscape work. You may be working in low light conditions and handheld shots are not going to yield sharp images. You might also want longer exposure times to render water soft and misty or show clouds moving in the shot over a number of seconds for added drama. There are plenty of strong, lightweight tripods to choose from that won't be a chore to carry with you on your shoot; couple a cable release with it and you are set.



16

Take control

If you are relatively new to DSLR photography, you may still be using your camera's auto or semi-auto functions where it will decide on the best settings to use in either Shutter Priority or Aperture Priority. As long as it is in auto, it will keep making decisions for you and you will end up with shots that don't match your expectations. In manual mode you can decide on how the scene is exposed. Make the creative decisions; don't leave it to your camera.



29

Depth cueing

A photograph only has two dimensions and any indication of depth in a photograph is purely optical. One of the simplest ways to add depth is to use leading lines like the curve of sand on a beach image or railway lines converging towards the horizon. Another method is atmospheric perspective where mist and fog shroud distant objects making them lighter and with less tonal contrast compared to darker foreground objects.



19

Don't fear the histogram

A histogram is a graphic representation of the tonal values in your shot and how they are distributed. If the graph is bunched at the far left, then your shot is very underexposed and you risk the loss of a lot of detail to shadow areas. If it is sliding off the right hand side, then it will be overexposed and detail will be lost in the highlight areas. A good exposure will have all the major tones in the middle of the histogram.



Landscape photography tips

13

Framing & composition

Composition is a very subjective thing. What looks good to your eye may look odd to someone else. If nothing else, keep the 'rule of thirds' as your main compositional tool. Imagine that your frame is split by lines into thirds, both vertically and horizontally. Placing an object of interest at one of the points where these lines would intersect means you are adhering to the rule and this will help bring balance to your shot. Rules can be broken though, so it's up to you.



14

Stay sharp

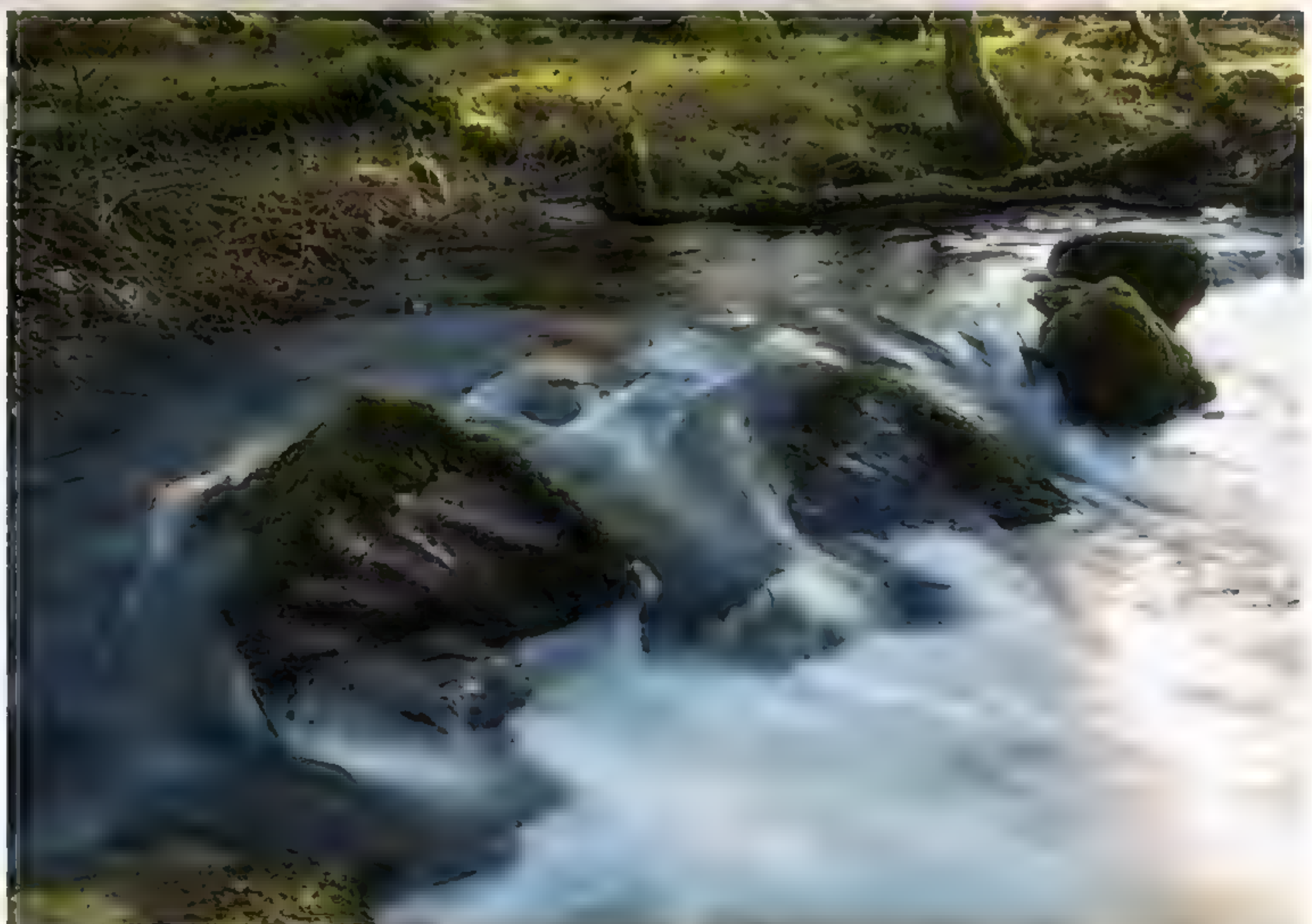
Photographers will want their scene to be as sharp as possible from front to back. This is where depth of field comes into play. At large apertures such as $f/2.8$, the area of sharp focus in front and behind the point of focus will be relatively small. Using a much smaller aperture such as $f/11$ that 'zone' of sharp focus is much greater. As a rough guide, focus on a point about one third of the distance into your scene to give yourself the best chance of maximising the depth of field available.



15

Maximum exposure

Consider using longer exposures in your landscape shots. Photographers often employ exposures that last seconds or even tens of seconds, to show clouds streaking across the sky rather than looking static and puffy. Scenes shot with a much longer exposure will turn the water to a misty, milky fog. It is safe to say that your tripod is the key to the success of these shots.



22

Out of the shadows

While a bright summer day may seem like the perfect time to take photos, at midday every scene will appear flat and featureless with shadows sitting directly beneath every object. The perfect weather for outdoor photography is a bright day with a few white clouds to help diffuse the light and take the edge off the shadows. The perfect time is around sunrise and sunset with long shadows defining the contours of the land.



26

Wet weather

If you're taking your camera out in wet weather make sure it's properly protected. Keep your camera in a rain proof bag or case until you need to use it. If rain gets on the lens, wipe it off with a soft lens cloth. If your camera does get wet, take the battery out, dry it thoroughly using paper towels for the body and soft cloth for the lens; then leave it somewhere warm and dry for 24 hours before trying it again.



28

Persistence pays off

The great outdoors is unpredictable to say the least. The weather has a habit of doing exactly the opposite of what you want, when you least want it to. This can be a big turn off for many new to photography. Don't let below par weather put you off. Sometimes you have to be brave and get out there and be prepared to sit and wait. You could be rewarded by a break in the weather that reveals some sublime lighting that makes it all worthwhile.



Rural and natural landscapes

Capture the countryside in all its rugged beauty

There is often a misconception among budding photographers that landscape photography is something of an easy option when deciding on a subject to capture. Sometimes it only takes a twenty minute drive to transport you from your local town and put you among the marvels and beauty of the natural world. While it is certainly true that the natural world is very accessible, it can be another thing altogether

to create memorable landscape images. It isn't just a case of arriving at a destination, firing up your DSLR and snapping away like a mad thing. The skills you may have that enable you to operate your camera are quite distinct from those that allow you to envision a beautifully composed image within the landscape you currently find yourself. Both are dependent on each other to deliver great landscape images.

Unexpected weather and lighting is common on Dartmoor. Be aware of a turn in the weather though, it can change fast and not in a good way.

Canon 5DMK2 - EF 24-105mm f/4
f/13 - 6 secs - ISO 50

“While it is certainly true that the natural world is very accessible, it can be another thing altogether to create memorable landscape images.”

A sense of scale

When you step out into the environment, the first thing worth considering is the scale of the scene you are capturing. While landscape photographers mentioned the wide-angle lens as the primary lens to consider for landscape work, you don't always need the widest lens available. It can be fun to challenge yourself and the rulebook. Knowing what to leave out of a shot, is just as important as what to include.

The broad canvas

Wide-angle lenses are the primary tool for landscape photographers. Covering a huge expanse in your shot can make for immersive images but be aware that a wide-angle lens will capture a very large field of view. Elements in the foreground, like rocks or a tree, will look very small in the frame. Also consider

that if you have included some foreground interest close to your camera and shoot it at a wide focal length such as 14mm-16mm, it will be very small in the frame. It's a good idea to capture at either end of the day during the golden hours when the sun is low to the horizon.

A picture in a picture

Next comes the more intimate landscape. It can actually be an effort of will sometimes to force yourself away from the wider view and consider shooting a more intimate landscape. This is where you zoom in or move closer, to isolate a particular aspect or detail from the whole landscape and show it as if it were a scene within a scene. It may seem counterintuitive to use a telephoto lens in cases like this to pull a

particular feature towards the viewer. Although not a rigid rule, diffused or indirect light is often used to capture greater detail because of the lower

Up close and personal

light levels. This is where you deliberately focus very closely on one tiny element of a scene. Often you are drawing attention to something that is too small to be seen by a casual viewer. It can be an interesting challenge to find a tiny detail that is not only visually appealing but also tells a story. This is where you zoom in or move closer, to isolate a particular aspect or detail from the whole landscape and show it as if it were a scene within a scene. It may seem counterintuitive to use a telephoto lens in cases like this to pull a



16mm wide-angle



50mm medium-telephoto

You don't always need to capture the widest view possible, even if it seems the likely thing to do. Sometimes a closer, more intimate shot can be effective, even down to the macro level if you should so wish.



Rule of Thirds composition technique places a point of interest on one of the lines or intersection points of the grid.



[Above] this image of Brentor, near Tavistock, was taken about 15 minutes before sunrise. Compare it to the main image (left) taken a few minutes after sunrise. The tones have transitioned from cool blue and pale yellow/orange hues to much stronger warm orange and yellow tones. The shadows, initially soft in the pre-sunrise image, have given way to much more defined shadows which will continue to become more harsh and deepen as the sun rises higher in the sky.

Rules? What rules?

It has become a bit of an overused cliché but the rule about there being no rules, still rings true. Rules can aid you in arriving at a pleasing landscape image but you should always have an idea in your mind about what works for you. The view through your camera's viewfinder should move you in some way, it should speak to you. Even if what it is saying is that you should try another view somewhere else that has more visual impact. At the risk of introducing even more cliché into the mix, here are some inspirational quotes that make a lot of sense.

Edward Weston

"To consult the rules of composition before making a picture is a little like consulting the law of gravitation before going for a walk."

Ansel Adams

"There are no rules for good photographs, there are only good photographs."

The raw materials

Any landscape image is a collection of visual elements, captured on film or via a sensor and framed accordingly by your choice of lens or cropped during post-work. Take a moment to distil the scene in front of you into its component parts before you take a single shot. Slowing yourself down and taking a more considered approach to your landscape photography will yield results.

Light it up

For a landscape photographer, light is the first and best raw material you have available to you. It will shape and colour the image, so you need to look out for the quality of the light. Knowing where

and when the sun sets and rises in a location is a key first step before you embark on a journey into the great outdoors. As we've said before, the golden hours are some of the best times to shoot landscapes, but you need to be aware of how the light changes from a soft, cool, indirect glow when the sun is still below the horizon to the warm tones and long shadows created as the sun finally appears.

Shapes and form

The light in your scene will naturally have an effect on the shapes and form of objects within it. Surface textures and patterns will be revealed, as well as colour and tonal values. Consider if you want to shoot your scene back-lit, with the sun in front of you, casting shadows in your direction or whether you turn the camera to shoot the scene front-lit with the sun at your back or off to the side.

This image of Brentor was shot shortly after sunrise. The image was framed to adhere roughly to the rule of thirds.

Canon 1DSMK3 - EF 16-35mm f/2.8
f/11 - 1/20 secs - ISO 50



If you're shooting directly into a sunrise there will come a point, as the sun gets above the horizon, when it will be just too bright to shoot successfully and you run the risk of lens flare and damage to your own eyes by looking at the rising sun for too long. That is a good time to simply rotate your camera by 90° or more away from the sun and shoot your scenes either side lit or front lit.

Framing the shot

It's not always a good idea to try to shoot through a window. Quite often a lot of light is lost through the glass and the resulting picture is very dark. If you are shooting through a window, you will need to use a tripod and a long exposure to get a good shot. You will also need to use a high ISO speed to get a good shot. You will also need to use a high ISO speed to get a good shot. You will also need to use a high ISO speed to get a good shot.

Keep your balance


It's not always a good idea to try to shoot through a window. Quite often a lot of light is lost through the glass and the resulting picture is very dark. If you are shooting through a window, you will need to use a tripod and a long exposure to get a good shot. You will also need to use a high ISO speed to get a good shot. You will also need to use a high ISO speed to get a good shot. You will also need to use a high ISO speed to get a good shot.



The pathway



The circular polariser is one of those 'must have' items in your camera bag. Once you have yourself positioned correctly in relation to the sun (between 90° and 180° away from the sun), turning the filter will darken skies and white clouds.



"Any strong curves or diagonal lines running up into your shot from either corner will enhance the image by leading the viewer's eye into, and around the scene."

Cut it out

The final framing of your shot will determine if your photograph will stand or fall. Take your time with the final composition. Landscape painters will often use a piece of card with an aperture cut out to use as a framing and compositional aid when viewing the landscape. There is no reason you can't do this too. Just match the aperture you cut in the piece of card to the proportions of your camera's sensor. Hold the card up to your eye at different distances and you can see the effect the different framing has on the composition of your shot.

Practice makes perfect

Here comes another cliché but one that is the basis of any learning experience. You can learn to 'see' with practice. As you photograph more, you learn more of what makes a good shot. The more you explore the more capable you are of making a good landscape photo, a great landscape photo. ■

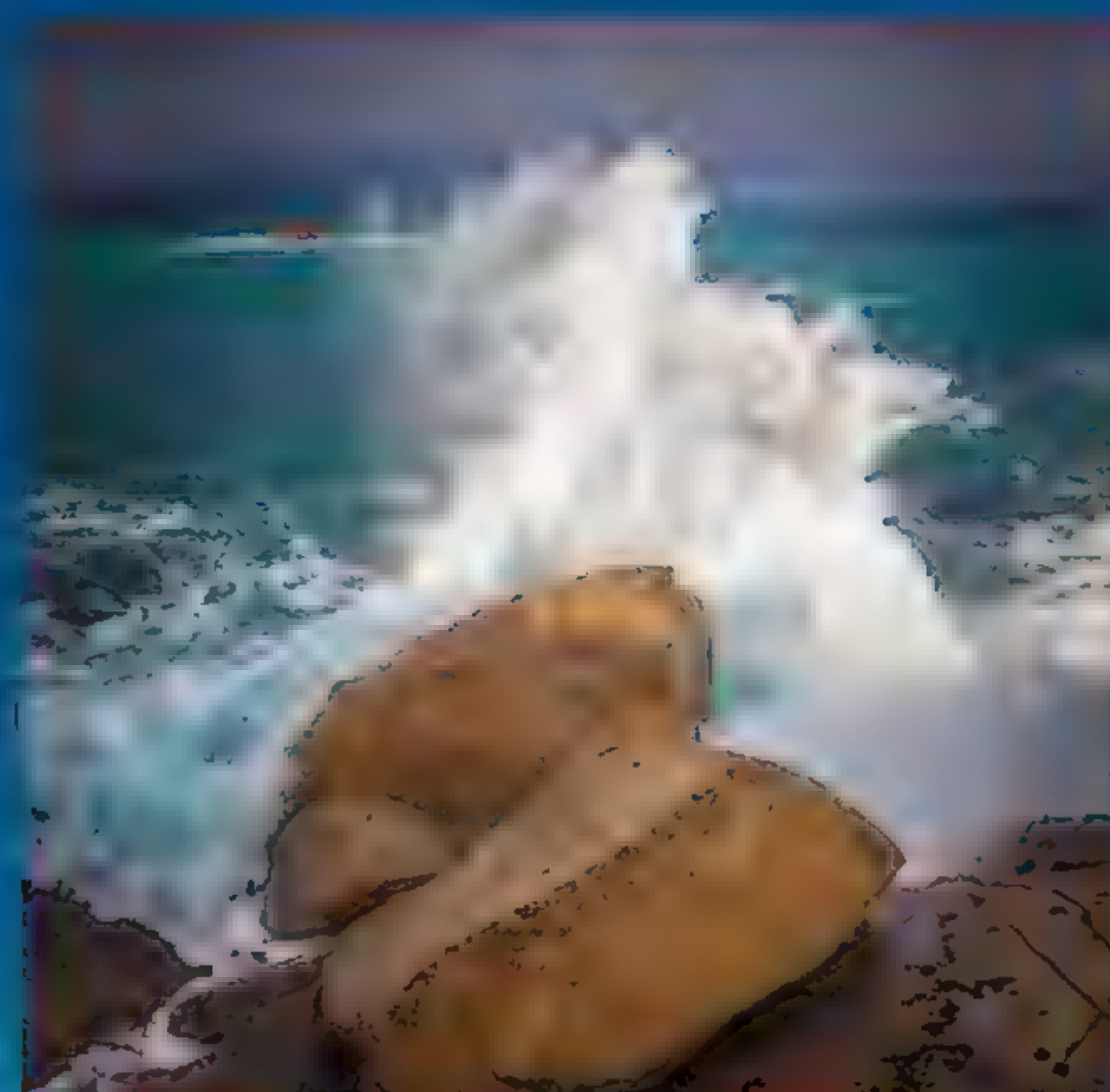
Coastal and seaside landscapes

A popular and dramatic subject

Coastal and seaside landscapes have always been an extremely popular subject for both artists and photographers. There is a certain something that lures us to the sea. It is both benign and unpredictable, powerful and awe inspiring. Coastal areas have a wealth of interesting features, from large flat expanses of sand, rocky pools and coves, as well as soaring cliffs and sand dunes. There are also the man-made influences, ports and towns that spring up around key coastal areas. The photographic potential is vast. The coast and the sea have some of the best image capture potential that you could ever hope for.

The sun begins to rise, casting a faint warm glow on the sea. Taken from a rocky outcrop on Hope's Nose in Devon.

Nikon D5500 - Sigma 10-20mm f/3.5 DC HSM
f/6.3 - 30 secs - ISO 100



“There is a certain something that lures us to the sea. It is both benign and unpredictable, powerful and awe inspiring.”

A unique environment

If you are lucky enough to live near the sea, or are within a reasonable distance of it, you will probably be aware that it is an ever changing and unique environment. With the ebb and flow of the tides, the coast is constantly being washed clean, ready for a new cycle to begin. No matter how many times you visit the same beach for instance, the patterns, pools and gullies will always be different after each high tide. The sea state is in constant motion too. One day mirror flat, the next it is a roaring cauldron of white water and spray.

Plan ahead

With all this in mind, when you are deciding on a trip to the coast, it pays to plan ahead. Tide tables are invaluable to plan what time of day the high and low water is, as well as the height of the tide. The tide heights will vary throughout each lunar month from Spring tides (greatest height difference between high and low tide) to Neap tides (smallest difference between high and low tide). It is this that will govern what you have access too, as well as what may be visible as the water rises and falls. Any local knowledge regarding rip tides and fast flooding of beaches will also help to keep you safe.

Avoid the crowds

When deciding to visit a particular coastal venue, it is worth remembering that during the summer months, it is likely to be busy. That said, if you want the best light, then you are going to have to be there before dawn to have time to set up, so hopefully the only people you're likely to encounter are other motivated photographers such as yourself. During the winter months, beaches are going to be much quieter too.

Keep it clean

We have previously indicated how you need to keep yourself safe when you are out. The same is true of your gear. If you are out in the sand is a potential source of trouble. If the beach is not clean, you will have a problem. Always closely monitor the sand around you and if necessary, keep your gear away from it with a good quality weather proofing kit. A good cloth will also be needed to keep the top of your lens and of your lens free from sand and moisture.

Cliffs or beach?

It can be tempting to stay on the beach edge when shooting. But if you are out in the

especially if there are a lot of interesting rocks, pools and sand patterns, it is worth considering the wider view from an elevated position too. If there are prominent cliffs, it may be worth the walk up there. Depending on the time of year, the cliffs may be full of flowers or tall grasses and bushes that you can use as a background and interest. Plus, you may be able to see a lot of interesting things from a high vantage point. If you are out in the sand, you will have a problem. Always closely monitor the sand around you and if necessary, keep your gear away from it with a good quality weather proofing kit. A good cloth will also be needed to keep the top of your lens and of your lens free from sand and moisture.

How slow do you go?

When shooting a coastal scene, it is important to

faced with choices when it comes to how you portray the water. It is a popular, if overused, technique to place a solid ND filter over your lens to extend the exposure time to several seconds or longer to soften the water and render it more like mist. If you want to retain all the shape and texture of the water, then you'll want to keep the shutter speed up around the 1/60 of a second area. For freezing crashing waves completely, you'll need to push it to 1/500 of a second or more. Alternatively, try and shoot the sea at around 1/10 of a second. This allows some softening of the water, but it captures a sense of motion, something flowing of the water in and around rocks, without becoming an amorphous fog.

Three rocks create a simple coastal composition. The water was shot with a long exposure to help the detail of the rocks stand out.

Canon 5DMK3 - EF 24-105mm f/4
f/22 - 8 secs - ISO 50



The view from North Cliff near St Ives.



The pebbled beach at Seaton.

Although it may be tempting to stay down by the water's edge for your coastal shots, views from the cliffs above overlooking the sea, can be stunning. Many popular coast paths are your gateway to some spectacular views.

Below are four examples of how moving water can look with the use of different shutter speeds. Longer exposures render the water foggy, shorter exposures can stop the movement in its tracks.



Paignton beach. A deliberately simple composition using a low angle that focuses attention on the lone shell.

Canon 5DMK2 - EF 24-105mm f/4
f/4 - 1/500 secs - ISO 50



Sometimes, there is no need for the widest shot possible. Always consider a longer focal length at times to isolate a particular detail.

Nikon D5500 - Sigma 10-20mm f/3.5 DC HSM
f/22 - 0.5 secs - ISO 100

Shooting a 4 second exposure as the foamy seawater recedes around this warning marker creates these flow patterns.

Canon 5DMK3 - EF 16-35mm f/2.8
f/7.1 - 4secs - ISO 200



Beware of the glare

If you are photographing on a wet beach or on rocks still wet from the high tide, consider using a polarising filter to help reduce unwanted reflections and enable you to see the detail. Rock pools, wet seaweed etc. will all benefit from the use of the polariser to reduce glare if you are shooting in bright conditions. It will help bring colour back into your subjects and it will also enhance the contrast and saturation of the shot.

Wide-angle and telephoto

Lens choices can be governed by the kind of shots you want to capture. Generally, a wide-angle lens, when used close to an isolated foreground element and with a short focal length around 16mm-20mm, can create a distorted perspective that is actually quite pleasing to the eye. It works well when your point of interest is fairly isolated and there isn't too much going on the scene to create unwanted distractions. Conversely, you can swap your wide lens for a standard zoom lens in the 70mm-200mm range to shoot very intimate miniature landscapes. This is where you capture very isolated elements of rock, water, sand and any interesting flotsam and jetsam washed up on the shore. Rule of Thirds composition is worth keeping in the forefront of your mind as you set up your shot. The low contrast lighting of an overcast day is also great for these types of images, making the shot just about texture and form.

Enjoy your visits to the coast. Take great pictures. Just make sure you stay safe to return another day. ■

Filters for landscape photography

Using filters in your landscape shots

You are out and about happily taking photographs, with gorgeous sunshine to brighten the experience. It's your last day before venturing off home and you happen upon a scene that you want to capture. The sun is directly in your eyes but the sun's position is creating a dramatic lighting effect. What can you do to get the most from the opportunity?

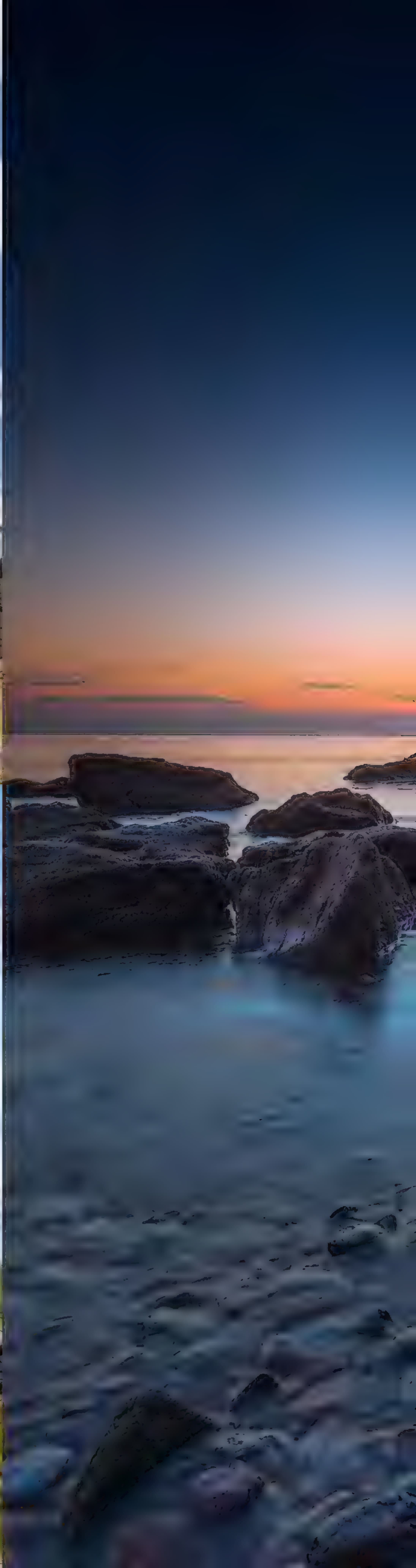
The problem is that the dynamic range of the scene before you is very extreme because the sun itself is part of the shot. You have options of course. If you had the time you could wait until the next day when the sun is in a different part of the sky but then you wouldn't have the drama of the sun low to the horizon. You could bracket your exposures if you had a tripod. You could expose the shot so the sun and sky isn't blown out, but then the rest of your shot will be very underexposed if not totally in silhouette. Conversely you could expose your foreground correctly and hope the sky doesn't blow out too much that you can't recover any detail when you come to process your shots.

All these methods will work to varying degrees, but many photographers also try to get a balanced exposure first time 'in camera'. This is where the use of filters can be essential.

The example image here was shot using a 2 stop graduated Neutral Density filter [1]. The filter is reducing the amount of incoming light where it is darkest and letting more light in as it fades to clear. There are various filter manufacturers who all make specialist holders able to be mounted to the front of your camera that can allow you to use up to 3 filters in one go. You slot it in and adjust it so the darkest part is at the top and the point it goes clear is roughly level with the horizon as you look through the viewfinder [2]. You can compose your shot, take an average meter reading of the entire scene using your camera's evaluative metering setting and capture your image knowing that the filter has balanced the tonal value of the scene and lets you keep detail in the sky and not underexpose your foreground [3].







A word about filters

ND grad filters come in various types. The two main ones are hard and soft grads. This means that a hard grad filter is quite abrupt in the way it transitions from its darkest portion of the grad to lightest. The distance between the dark and light section of the grad is very short. A soft step grad is much more subtle and transitions much more smoothly over a larger distance on the filter.

Filter density ratings

ND2	(ND 0.3) = 1 f-stop reduction
ND4	(ND 0.6) = 2 f-stop reduction
ND8	(ND 0.9) = 3 f-stop reduction
ND16	(ND 1.2) = 4 f-stop reduction
ND32	(ND 1.5) = 5 f-stop reduction
ND64	(ND 1.8) = 6 f-stop reduction
ND128	(ND 2.1) = 7 f-stop reduction
ND256	(ND 2.4) = 8 f-stop reduction
ND512	(ND 2.7) = 9 f-stop reduction
ND1024	(ND 3.0) = 10 f-stop reduction

Flat horizons

A hard grad is used mainly on landscape images where the horizon of your scene is very flat with very little variation caused by rocks, cliffs, or other structures. It is easier to position a hard grad along a flat horizon line and it not be obvious that a filter is being used. A soft grad is better to use on compositions where there is much more uneven horizon line. Uneven horizons are more of a challenge when it comes to placing the soft grad as there are certain issues that come into play.

Uneven horizons

A landscape scene that has a prominent feature jutting out of the horizon line such as trees or rock formations will be affected by the graduated filter and look oddly dark compared to the rest of the scene below where the filter's effect is reduced. You could move the grad upwards but then the light at the horizon level will become more overexposed again and lose the benefit of having the grad there in the first place. The main rule of thumb here is to take test shots with different placements of the grad to see what looks best to your eye. Bear in mind that as you stop your camera down to achieve greater depth of field, the grad's transition will also become more obvious. If a shot starts to look that there is all too obvious filter usage occurring, then a different approach may be in order. For most general scenes though, an ND grad is a worthwhile purchase if you can afford it. Nothing is more worthwhile than creating a well balanced image that you got right in-camera without having to resort to post work alternatives. ■



The blue hour and night time

There's more to a landscape than you might imagine

The blue hour is a period of time, within civil twilight, where the sun is below the horizon. This period is a prime time for the landscape photographer; neither day or night but something quite ethereal in between the two. The environment is bathed in a soft light and there can be a pinkish orange glow along the horizon, fading into to a deep blue sky. The world is full of promise as the new day begins, or conversely it is about to shut its eyes to drift off to sleep and it is this

magical feeling that photographers endeavour to capture.

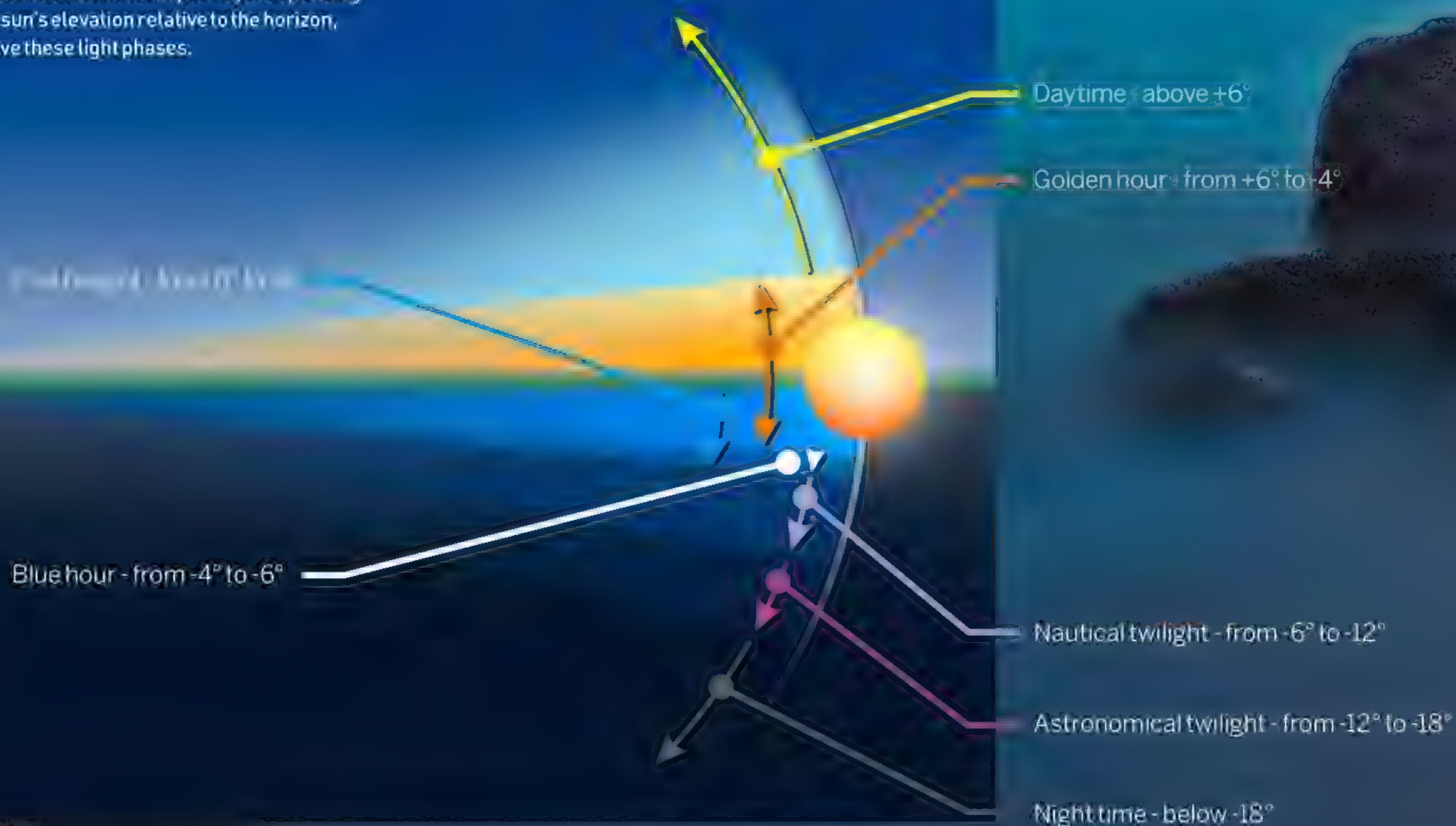
The time of year will dictate how long this period lasts. It's a good idea to have plenty of time to get yourself set up. You may only have 45 minutes at most to shoot your landscapes.

Websites such as www.bluehour-site-at-home.com companion phone app can tell you exactly how much time you have for a given location so you can plan ahead. When you get there you need to be ready with a few key considerations.

Use a tripod

This may sound a bit obvious but if you want to take photographs in reduced light conditions, sometimes range from seconds to minutes, you're going to need something sturdy to put your camera on. You will want to shoot in Aperture Priority with an aperture of around f/8 - f/11 for increased front to back sharpness.

Light and how it changes through the day can be characterised in a few simple ways. Depending on the sun's elevation relative to the horizon, you have these light phases.





An exposure stack of 15 x 30 second exposures were blended in Photoshop to produce this star trail image above an old Napoleonic fort on Berry Head in Brixham.

Keep the ISO low

Because you have your tripod keeping things steady for the camera, you can use the lowest ISO setting your camera will allow. This is a big advantage from the point of view of image quality. High ISO settings create a lot of image noise and can affect the sharpness of the shot, detracting from the overall quality of the image.

Shoot raw

Shooting in raw mode just allows you to extract the absolute last pixel of quality from your image and process it any number of creative ways non-destructively. You can happily alter white balance settings, cross process, split raw and any number of effects without losing your original image. Like using low ISO, it's another way of keeping the image quality as high as possible. Keep reviewing your shots to check for good exposure and make sure they are sharp where they need to be.



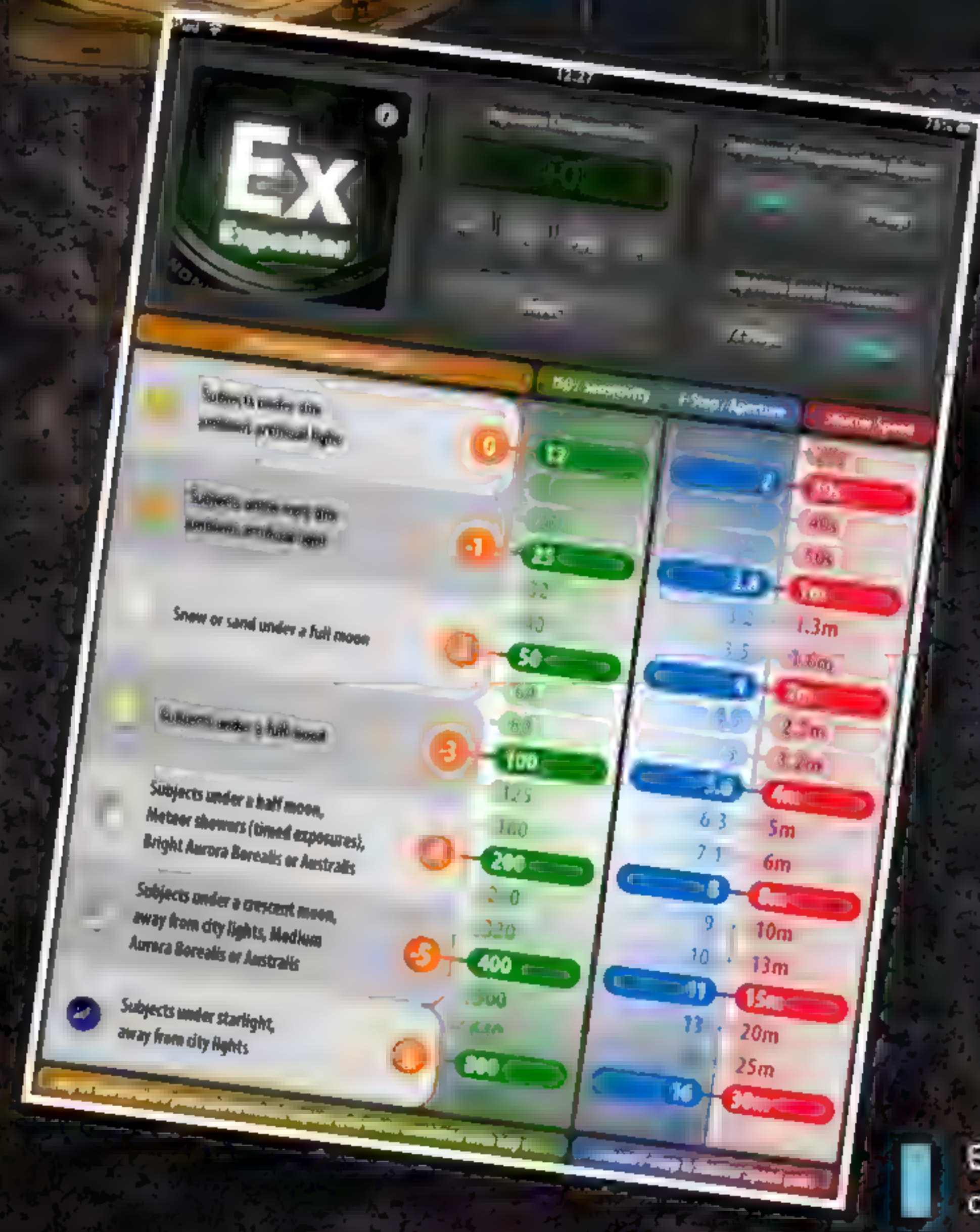
The moon floats over a pre-dawn Tamar valley shrouded in mist. Dawn was about 20 minutes away.

Canon 1DSMK2 - EF 70-200mm f/2.8
f/2.8 - 2 secs - ISO 50



The blue hour is considered a great time to shoot cityscapes. The lights of this seaside town work well against the inky sky.

Nikon D5500 - Sigma 10-20mm f/3.5 DC HSM
f/8 - 10 secs - ISO 100



Expositor is a great app for helping you calculate those tricky exposure times.



Along with your camera and a good tripod, a wide-angle zoom lens is a great compositional tool. A cable release is also useful for when you get into those longer exposures.



Nights on the island of Tresco suffer no light pollution. A clear night sky can reveal stars of many orders of magnitude with a suitable long exposure.

Canon 5DMK2 - EF 15mm fisheye f/2.8
f/2.8 - 20 secs - ISO 1600

An exposure stack of 15 x 60 second exposures taken on Dartmoor by Haytor Rock. They were blended in Photoshop to produce this star trail image revolving around the polar star.

Lens choice

Wherever possible use a lens with as wide a maximum aperture as possible, such as f/2.8. You may well be shooting at smaller apertures than this but the image in the viewfinder will be brighter with a faster lens, helping you to see and set up your composition. A wide-angle zoom is a good choice as it does offer greater scope for framing and composition without having to move around too much once you are set up.

Bulb mode

With most current DSLRs the longest shutter speed you can use in normal operation is 30 seconds. However if you switch to Bulb mode ("B") on your camera, you can keep the shutter open for much longer periods. Attaching a cable release or a more feature rich intervalometer, means you can activate the shutter and keep it open for as long as you need.

High ISO test shots

Since most modern cameras offer very high ISO settings, it makes sense before committing

to a possible long exposure or a sequence of long exposures, to ramp up the ISO to the max, take a shot and have a look at the composition, framing and exposure. When you've done your test shot at 2000 ISO and it looks great, how do you calculate the settings with the lowest ISO setting to get the quality you need?

The mathematical bit

At 2000 ISO your camera's meter tells you that for the aperture you are using, a shutter speed of five seconds gives you a good exposure. Now divide your high ISO number by the target low ISO number ($2000/100 = 20$) take your answer (20) and multiply it by the high ISO shutter speed value (five seconds) this gives you a final answer of 100 seconds (1.6 minutes). If you prefer, there are apps for iOS and Android that can quickly calculate any combination of EV, ISO, F-stop and exposure time you care to dial in.

Shooting in the blue hour and at night can be quite addictive for many people. Apart from you and your gear, grab yourself a good torch and a flask of hot coffee and you're good to go. ■

Sunrise and sunset

Capturing images during the golden hour

As the sun arcs across the sky in daytime, the light is harsh and creates hard, deep shadows, which is why landscape photographers tend not to shoot during the main part of the day. When the sun starts to approach the horizon however, that is a different matter. The closer the sun is to the horizon, the more atmosphere it has to shine through. This has a softening effect on the quality of the light and reduces overall contrast in the scene. Shadows are long but softer and colours are enriched. The light of a sunrise has quite a cool bluish colour temperature, whilst the light of a sunset, particularly if there is a lot of dust in the atmosphere, can be very warm orange and reds.

Sounds like a plan

We've mentioned it before, but we will say it again. Plan ahead. Research the location you will be visiting. A pre-shoot scouting expedition is always a good idea to get a feel for a place. Use apps that tell you what time sunset or sunrise is and how much golden hour light is available for the location and time of year.

Using filters

When shooting the golden hour, lighting can be a little tricky and it is recommended that you use a tripod as a matter of course. The problem is that if you expose for the foreground the sky will be overexposed, if you expose for the bright sky, then your foreground will be too dark by comparison. You have the option to shoot with a graduated ND filter (a 2 or 3-stop grad will work well) positioned to reduce the brightness of the sky in order to balance the exposure with the foreground.

Bracketing your shots

As an alternative, if you don't have filters, take a bracketed sequence of 3 shots where you shoot one average exposure, then set the camera to overexpose the shot by 1 to 2 stops and a third one to underexpose the scene by the same amount. This way you can blend the best ones in Photoshop to arrive at a balanced final image.



A three shot bracketed sequence gives you more tonal range to play with during the post-process stage.

Grad filters can help you get more balanced exposures at the shooting stage, rather than post-process.

A few minutes after sunrise on Haytor, Dartmoor. The pyrotechnics of the golden hour will be influenced by local meteorological conditions, so a hoped-for glorious red sunrise may last longer than expected, or may not appear at all. That's the random nature of the weather for you.

Think thirds

Although in terms of composition, you don't have to strictly adhere to the rule of thirds for your shots, it's always a good place to start. Just placing your horizon one third of the way from the bottom or top of frame and a point of interest one third from the left or right of frame creates a dynamic balance that is hard to beat. Rules can be broken of course, so see this as a jumping off point for creative choices.

Starburst and lens flare

If the sun is in your shot, stopping your lens down to about f/16 will produce a very cool

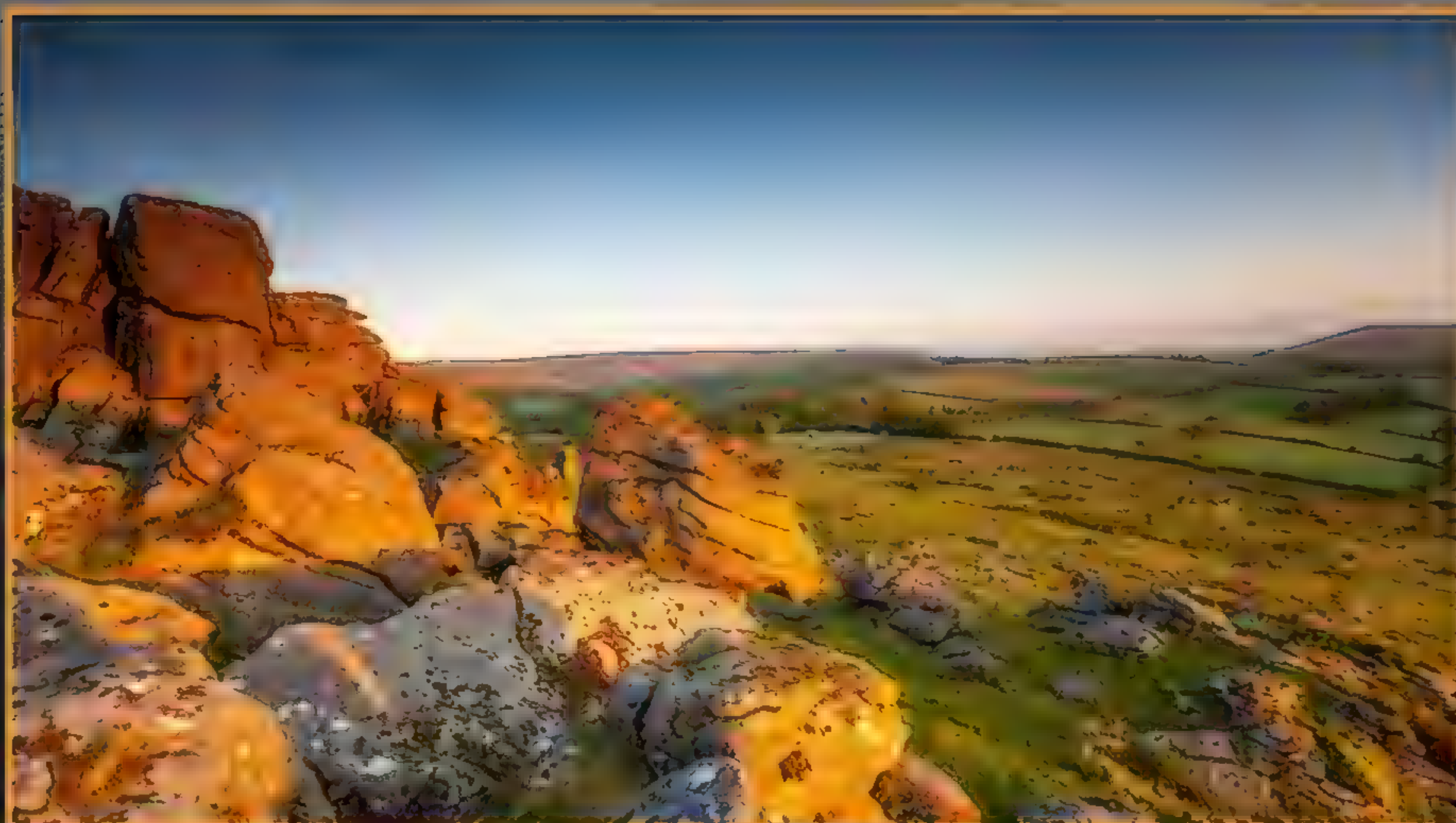
Interesting features

If you're shooting by water, it can be a great creative device for creating reflections. If the water is calm enough, you put the horizon dead centre in a horizontal 50/50 split and flip the image to have the reflection as the main element of the shot. Look for cloud formations, put your horizon low in the frame and make the sky the point of interest, if there is some interesting natural geological feature, don't be afraid to zoom in on that and fill the fr



Dartmoor is bathed in the light of a glorious sunset. Shot at f/22 the bright disc of the sun is adorned with an impressive starburst.

The camera was positioned to place the sun just behind this rocky outcrop on Hound Tor, Dartmoor. The intensity of the sun is easier to manage and you get a great halo effect into the bargain too.



Turn around

As the sun rises away from the horizon, the light will become more intense and shooting directly into the sun will present all manner of exposure issues. That is a good time to do an about face and shoot in the opposite direction so your landscape is front lit. Be aware of the very long shadows. You may find you have to adapt your framing and position to make sure your own shadow remains out of the shot.

Once you have experienced the magic of landscapes in the golden hour, it becomes easy to see why, for many, this is the only time to shoot. The time you have to experience this atmospheric drama is quite fleeting each day; happily of course, there is always tomorrow. ■

PORTRAIT PHOTOGRAPHY

Discover the world of portrait photography

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Portrait photography has been with us for a long time. It started to become very popular with the advent of the daguerreotype in the middle of the 19th century, where its reduction in exposure times, meant that sitting for a portrait was less of an ordeal. Until then, the average portrait shot could take minutes. Luckily, technology has given us all the means to enjoy portrait photography in the studio and beyond. In simple terms a portrait, or portraiture, is an image captured of a single person or group of people. Their mood, expressions

and personality are integral to the shot. Generally, the focus of a portrait will be the person's face, but of course, you can capture their entire body and also their surroundings in order to provide a story or context. It is also quite common to photograph animals and pets much in the same way as humans, they can look stylish just like any fashion model!

Over the course of the following pages, we want to introduce you to portrait photography and pass on a few ideas and tips to guide you on your way to being the next David Bailey.

“In simple terms a portrait, or portraiture, is an image captured of a single person or group of people.”

Portrait photography tips

1

Eyes in focus

The eyes convey emotion - whether sad, happy, playful or mysterious. If the eyes are not in focus, then the connection to the subject is lost. That doesn't mean the subject must always be staring down the barrel of the camera lens. It is suggested that if subjects are staring at the camera, they are portraying confidence or arrogance; if they are looking away, then they can be said to be nervous or mischievous. This is not always the case, but it can be a starting point in the portrayal of your subject. Even if the subject has their eyes closed, always think about making the eyes the point of focus. This can even be true when photographing non-human subjects. Dogs, for instance, are soulful creatures too, and our connection to them is through the eyes.



2

Point of view

It is quite common that nearly all portraits are taken at around the eye level of the subject. This is fine in most situations and is the staple of many portrait styles. However, sometimes it is great to change, so don't be shy in choosing other odd viewpoints. Think about getting low down and shooting up at your subject. Conversely, get up high and shoot down on your subject. Try mixing it up a little when shooting. Close-up portraits are fine, but perhaps there is a great shot to be had in a full-length portrait. Trying both landscape orientation and portrait orientation is also good practice. Don't be afraid to experiment; you never know what you will discover.



3

Location

The location is also important. If you shoot in a studio with a plain backdrop, then the story is told only by your subject's face. If you shoot on location, then it too can help convey emotion or a context. Shooting a portrait of a trucker with his vehicle or a solitary guy propping up the bar are examples of how the location can expand upon the story being told. It can be argued that a subject on their own, in close-up with no background, is a headshot; a subject photographed in an environment that is part of the storytelling, is a portrait. A subtle distinction, but perhaps true.



4

Composition

Just where and how the eyes are placed within the frame of the shot can add to the feel of the final image if they comply with the rule of thirds. There is conventional wisdom that states that a subject must have room to 'look into' a shot. Meaning that if they are looking left, the left of the shot has more empty space than the right. Now having just said all that, it's tempting to consider that rules are meant to be broken. Sometimes, odd placement of your subject in the frame can create a sort of visual tension that gives depth to the meaning of the shot. Having your subject's face dead centre or just have them barely in frame with one eye just keeping inside the border of the image can be a strong composition.



Portrait photography tips

5

Lighting

Lighting is an interesting subject when shooting portraits for colour or black and white conversion. There are so many different styles out there, it would be folly to try and pigeonhole one as being better than another. Light is there only to illuminate the story being told, or the emotion being captured. Just keep in mind the basics of lighting such as trying to avoid shooting in direct sunlight, as it creates harsh, dark shadows with no detail in them. Using a large white surface to reflect light back on to your subject will create a fill light that can lessen dark shadows. Alternatively, move to a more shaded area. If possible, avoid shooting with a camera-mounted flash, as you run the risk of getting 'red eye'; this is where the light from your flash bounces off your subject's retina back into the camera causing the pupils to look red.



6

Manual Mode

It's time to get into manual mode and out of your comfort zone. If you are working in consistent lighting conditions, on a sunny day or in a controlled environment with studio lights, or constant artificial illumination, choosing manual settings will present no problems. Just choose a group of parameters that yield the kind of exposure you want and shoot. Your camera won't be second-guessing every exposure every time and altering settings without you knowing. Also, try using just one centre AF point, rather than letting the camera decide. This method of single AF 'focus and recompose' is a great place to start losing the habit of letting the camera make the choices. Only if you are using insanely shallow depth of field would 'focus and recompose' present an issue.



7

Lens choice

Give some thought also to the lenses you use. Wide-angle lenses are not considered appropriate for close-up portraiture as they distort the features; but a good 50mm, 85mm or even 135mm prime lens is used for portrait work. Watch out for too much depth of field; it can be a great distraction for your background to be as sharp as your foreground. A little blur in your background is a great way to separate your subject from their surroundings, keeping them the focus of the shot. Also, keep your eyes peeled for the classic error that can crop up, where an item in the background appears to be sprouting out of the top of your subject's head.



8

Why prime lenses?

Fast glass is much prized in the world of portraiture. Fast glass has very large apertures, letting in more light and offering faster shutter speeds in low-light conditions. A good portrait lens that has a maximum aperture of $f/2.8$ - $f/1.2$ is fantastic at creating the background blur so sought after by photographers. The quality of defocused light this blurring produces is referred to as bokeh (pronounced boh-keh). The ability to shoot at $f/1.2$, for instance, means you can shoot more natural light portraits, without the reliance on strobes. Prime lenses from 50mm focal length and up are the best choices. Because of their simpler lens configurations, image quality is better and they offer larger maximum apertures over their zoom counterparts.





Setting up a home studio

Even basic equipment can produce professional results

Shooting portraits in a studio is an experience many fledgling photographers may never get to try. Many are often put off by the perceived complexity of setting up and shooting in an environment where you have to be in complete control of the lighting, the studio backgrounds, cameras, lenses and the models themselves.

There is also the issue of cost. Whilst it is true professional level studios are hideously expensive, don't imagine that a studio is out of your reach. We'll show you some simple home studio setups that won't cost you an arm and a leg. We'll also show you a few of the basic portrait lighting techniques to get you started.

Positioning your subject up against a clean blank wall or by a window in your own home is probably the simplest studio setup you can create. It's not a multi-million pound professional studio, but it is a great place to start.



The basics

The first and possibly simplest method to get started is to shoot in your own home. You have background choices in this situation. If you have a wall in a nice neutral colour with a clean surface, you have a backdrop you can use straight away. Avoid hanging up a crumpled white bedsheet as a backdrop with your model right next to it. Nothing says 'amateur' more than portraits taken in this way. Failing that, you can just wait until it gets dark, draw the curtains, and shoot some moody rim-lit portraits that have completely black backgrounds and therefore no distractions. You just need to be aware of any light spill from your flash lighting up parts of the room you don't want to be seen. Because you're in the home environment there will be sofas and chairs that can be used as props.

You can also position your subjects by a window and use natural daylight if needs be. You only need your camera and preferably a lens with as large a maximum aperture as possible to minimise any background distraction with the use of shallow depth of field. Lighting can be provided by a single flash. Always avoid using direct flash. You've no doubt seen too many flash photography examples where the subjects are lit head-on and have bleached out faces with no detail, and the classically unpleasant 'rabbit in the headlights' look.

If you can't get your flash off the camera, then bounce it off a wall or ceiling. The larger pool of light created by this method results in softer indirect lighting that is altogether more flattering.

Ideally, use a cheap wireless trigger system on your flash that lets you get the flash off the hot shoe of your camera. You can pick up a simple wireless trigger for less than £10 these days, and it gives you more creative control in the placement of your flash away from the camera.

Simple home studio

The next step up is to create a simple studio with multiple studio strobes. Shooting at home means you are limited by the size of the rooms you can work in, but if you are looking to take head and shoulders portraits, then you can set up a studio in a relatively small space in your lounge or kitchen. For a modest outlay of around £180 you can purchase a basic three light studio kit that comprises 3x 250w flash units, soft boxes, a shoot-through umbrella and barn door lighting modifiers. It also comes with some coloured gels, a wireless trigger and a large kit bag. Whilst it is not professional grade equipment, it is an inexpensive way to dip your toe into studio portraiture. Add to this a collapsible 1.5 meter x 2 metre background in white, black or grey, and you



A simple and cheap wireless trigger is a great way to quickly get into off camera lighting. It also saves you from a load of messy wires and cables that people can trip over.



Team a collapsible backdrop with a two-light setup and you have the main components of a simple home studio. It's an economical way of trying out studio portraiture for yourself.

are in business. A studio of this size can be set up in 15 minutes and then packed away into the bag with minimal fuss.

This is a great starter kit, and it is one you can add to over time if you wish, with additional light modifiers and different coloured backgrounds. Now you can experiment with multiple lighting setups and expand your creative portrait photography repertoire.



For any budding photographer, it's not unusual to see the home lounge temporarily converted into a studio. Two lights and a collapsible backdrop, and you are good to go.

Cameras and lenses

Whilst there are many compact and digital SLR's that have both the image quality and the resolution to do your portraits justice, it's actually the lens choice that could make or break the image. We could dedicate a whole magazine to portrait photography, but here are a couple of basic tips for choosing the best lens for the job.

First and foremost is the focal length you shoot at. Avoid shooting your subject at very close quarters and using a wide-angle lens. Focal lengths in the 14mm to 24mm range will show a pronounced barrel distortion of facial features where the nose will be very large in the frame and the ears very small, as if you were looking at your reflection on the back of a spoon. This is not flattering to your subject to say the least. You need to keep your focal length up around the 50mm to 135mm mark for more natural looking facial features. Most DSLRs come with a basic kit lens that covers a focal range somewhere in the region of 24mm to 105mm or more.

Pick a prime

A prime lens is an invaluable asset when it comes to portrait photography. Primes offer larger maximum apertures than their zoom lens siblings. A good portrait lens can have a maximum aperture anywhere from f/2.8 to f/1.2. This means you can throw your backgrounds out of focus to keep the attention on your subject. Whilst many professional prime lenses are expensive, you can still pick up a basic f/1.8 50mm prime for £90. The build quality may not be the greatest, but they have surprisingly good image quality for the money.



This Lumix GH2 has a lens that covers the 14mm to 140mm focal length. This is more than ample for some simple studio portraiture at home.

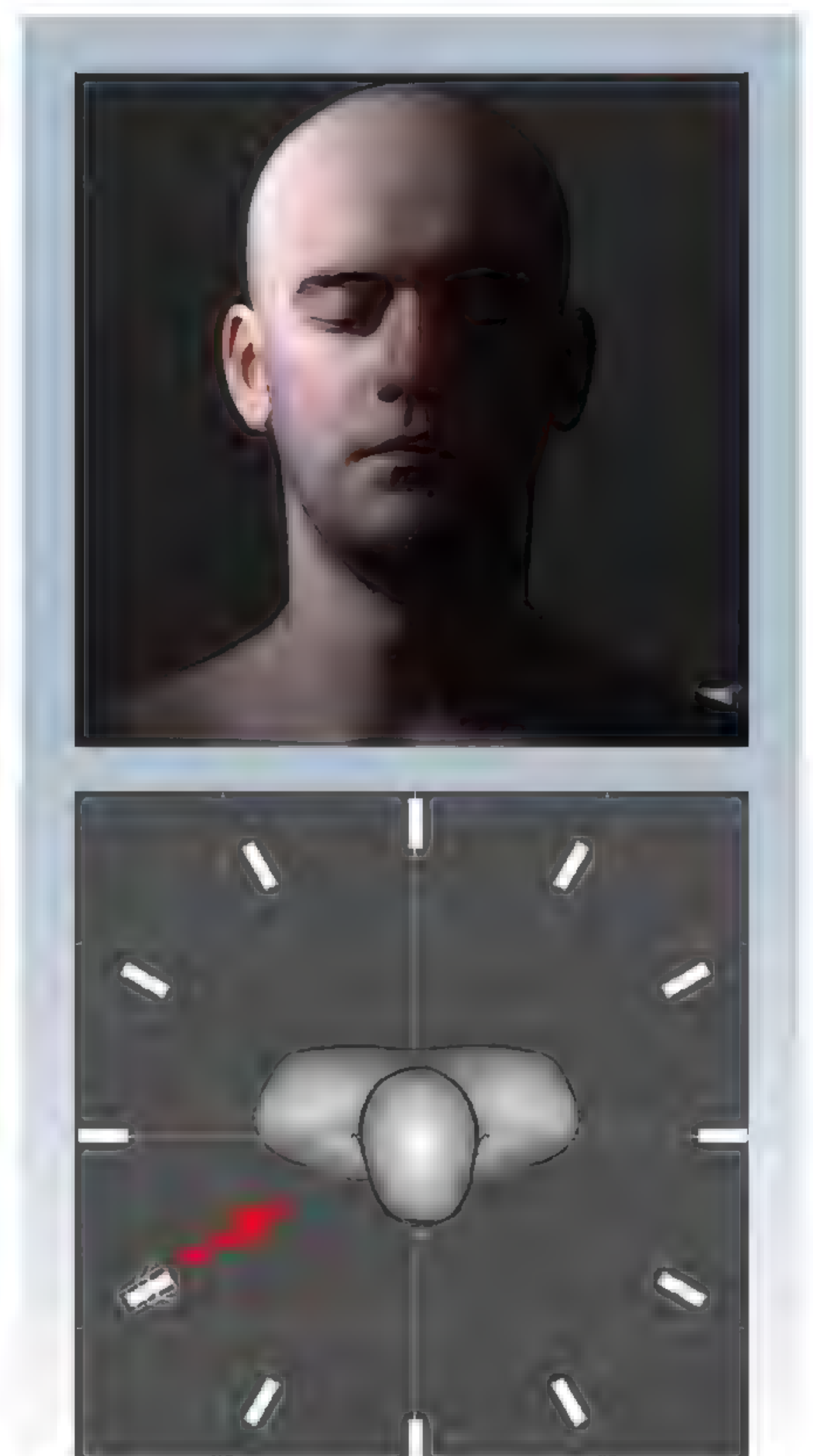
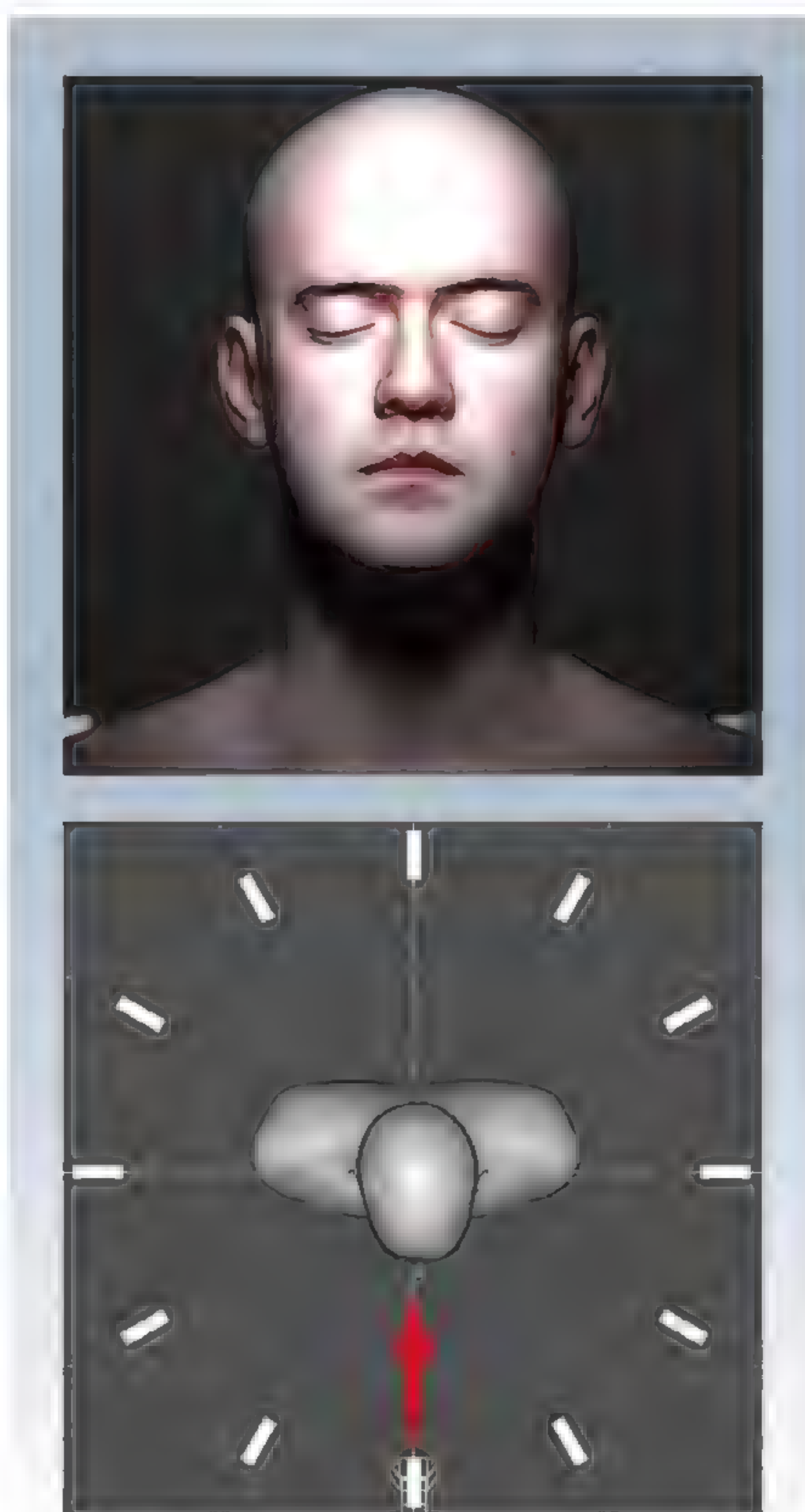
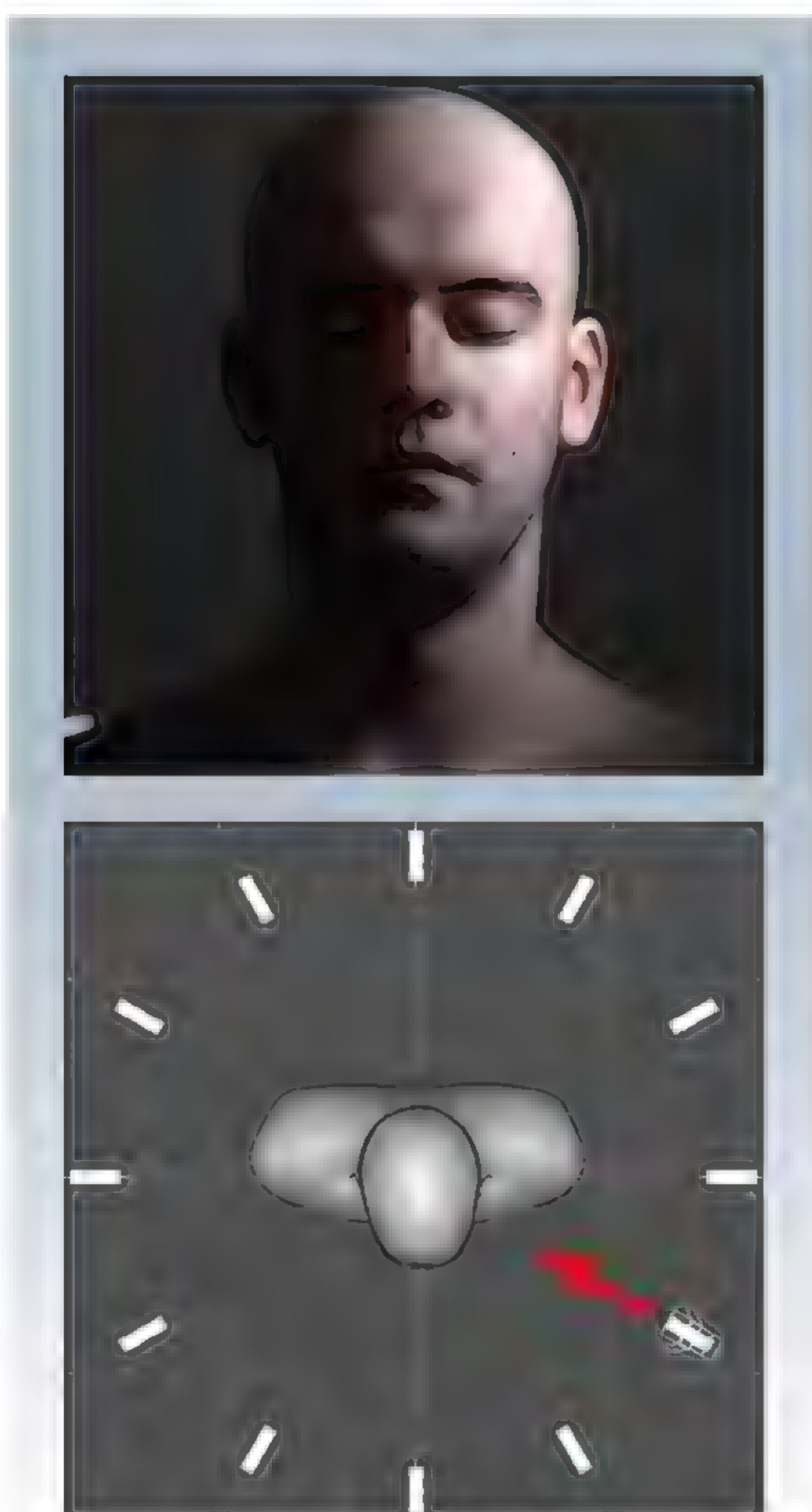
For lenses with very shallow depth of field, you will normally look at purchasing a prime lens. This very cheap 50mm prime has a maximum aperture of f/1.8, perfect for portrait work and out of focus backgrounds.



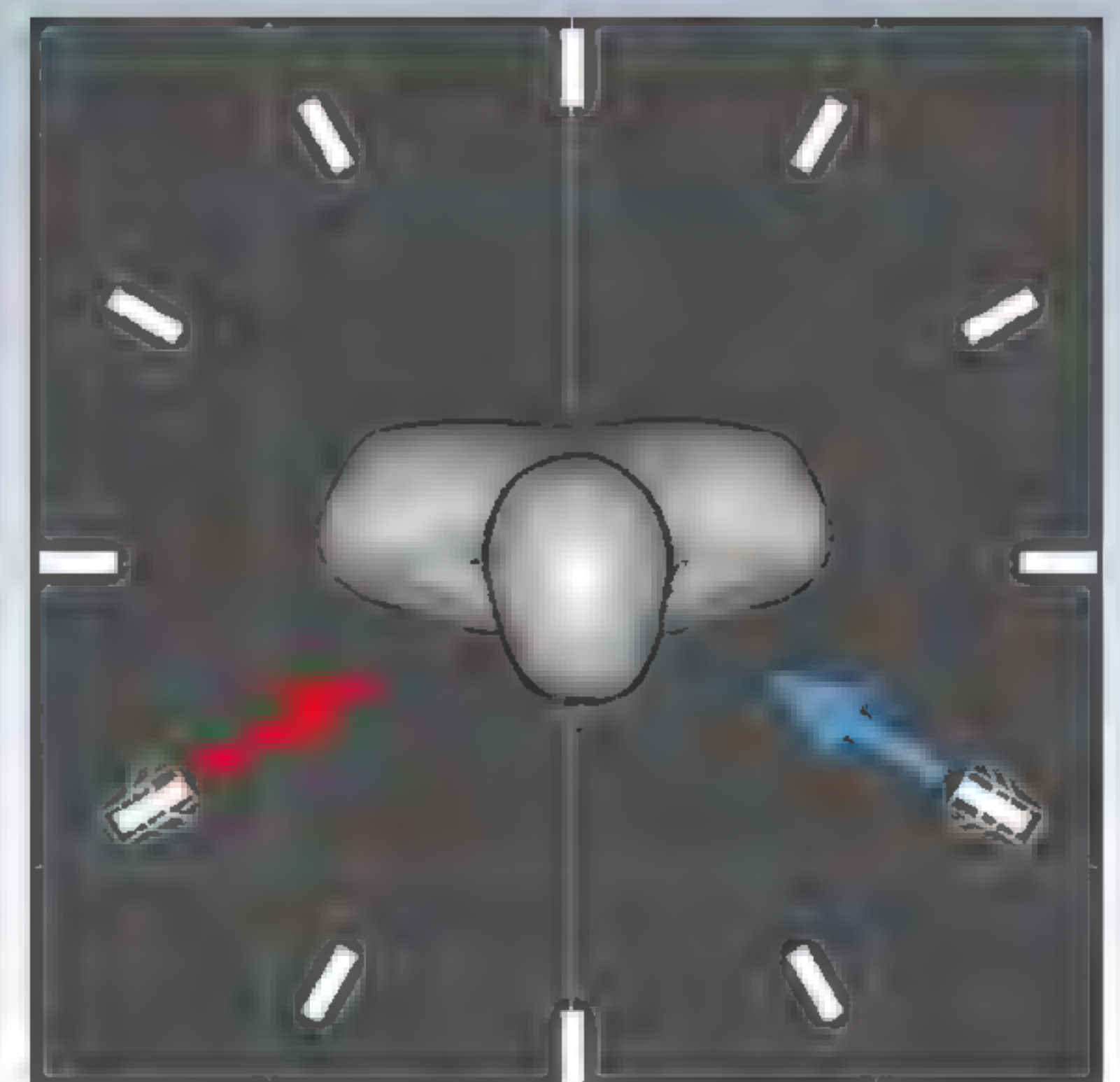
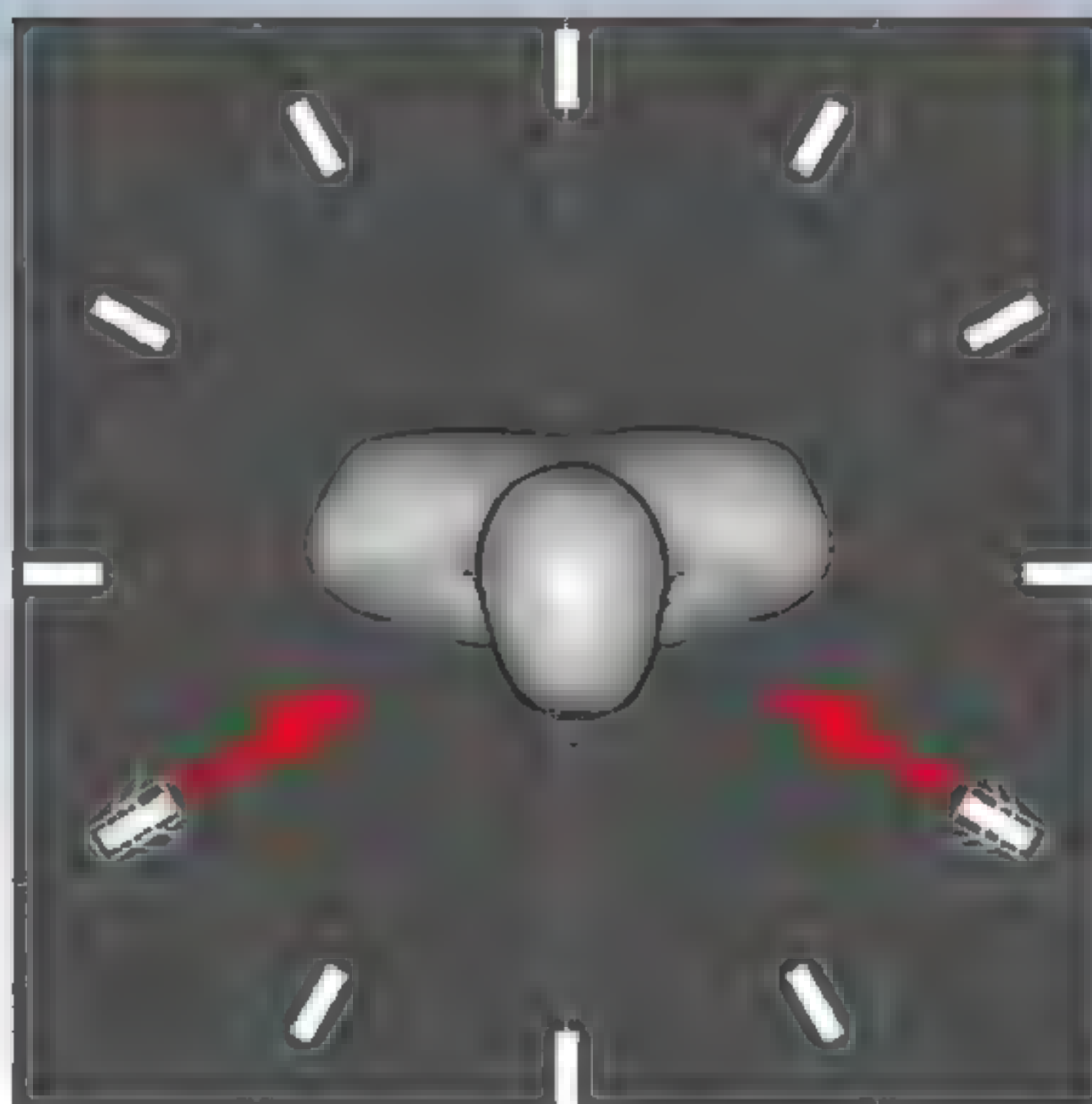
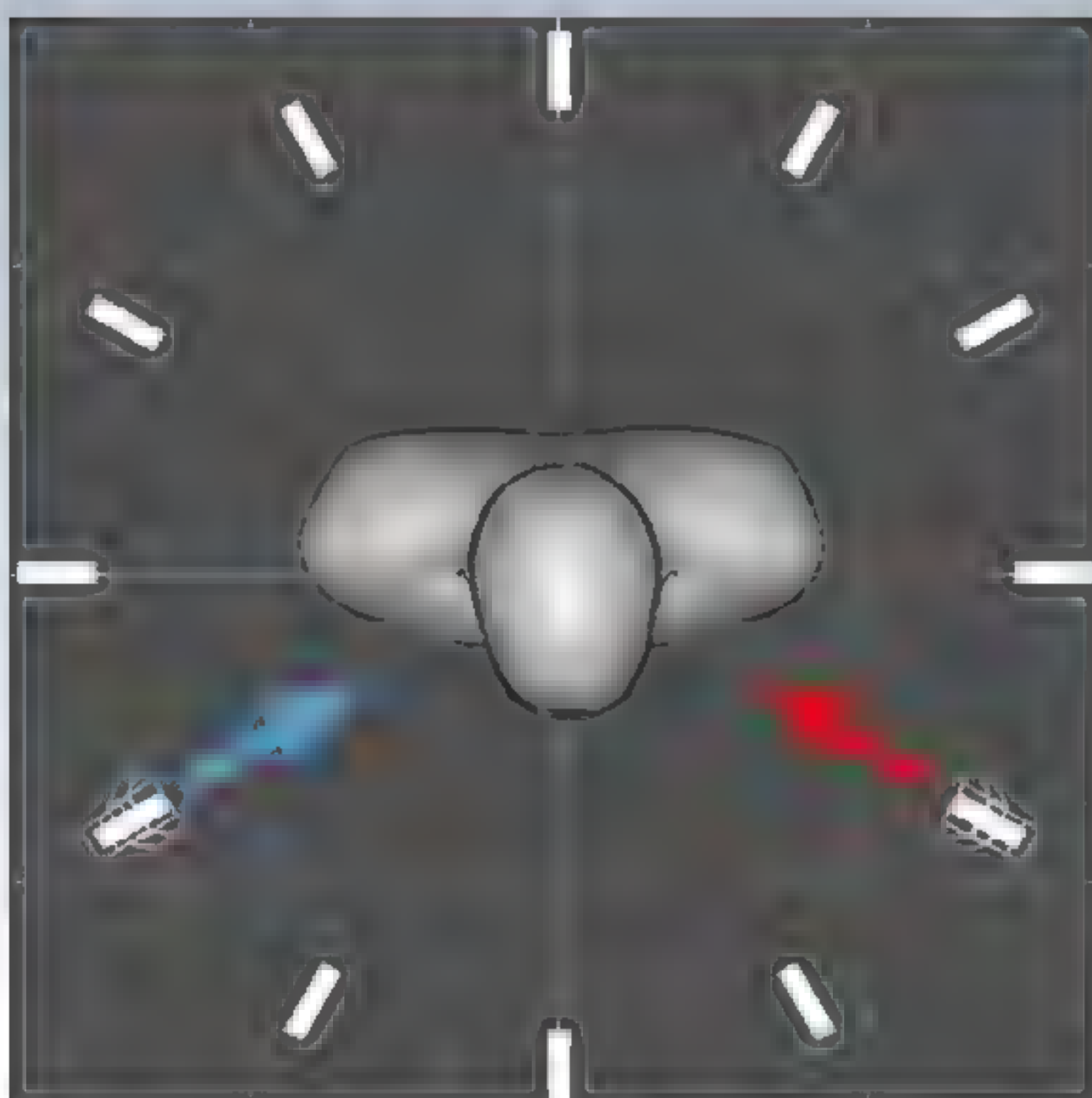
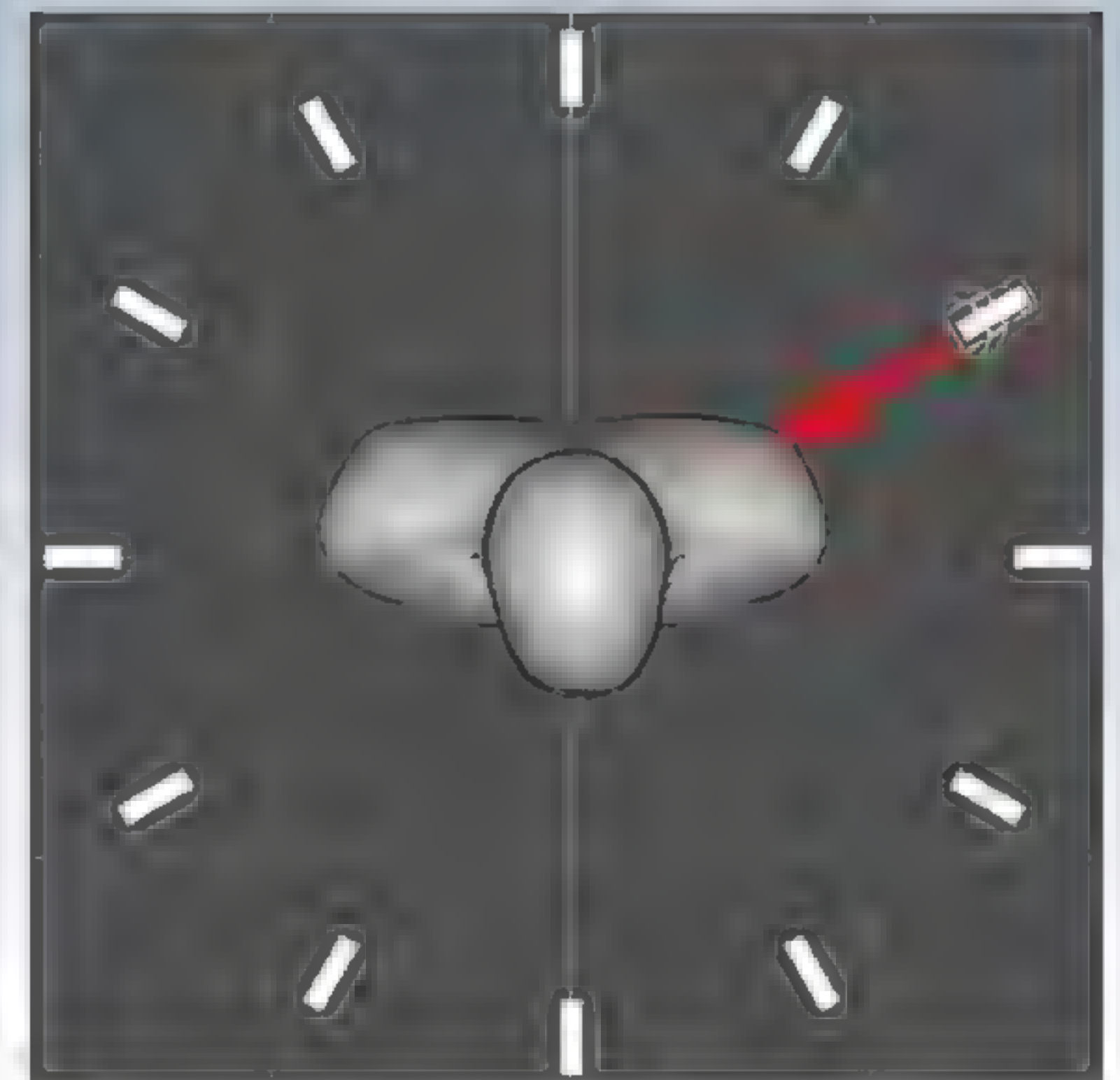
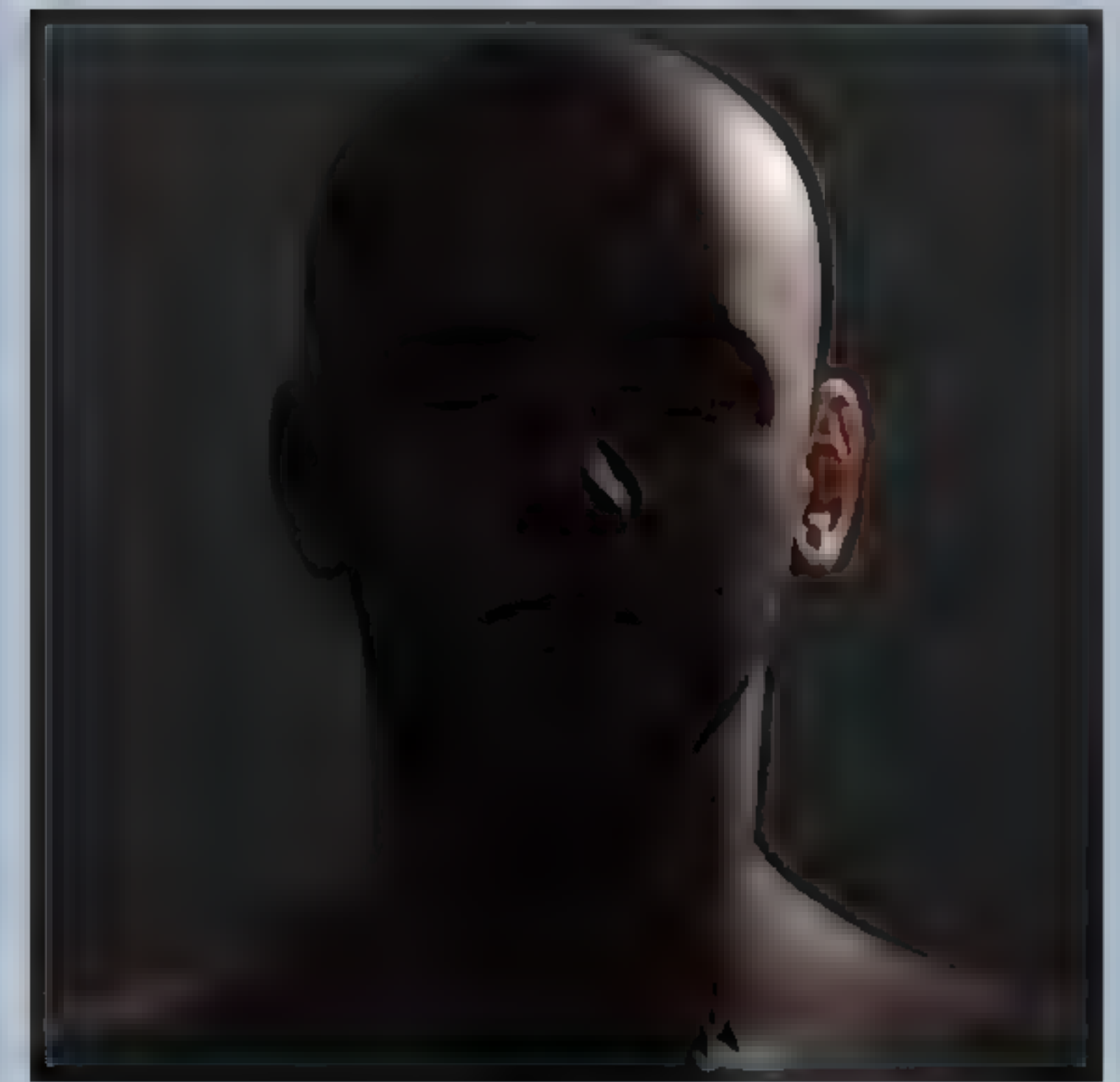
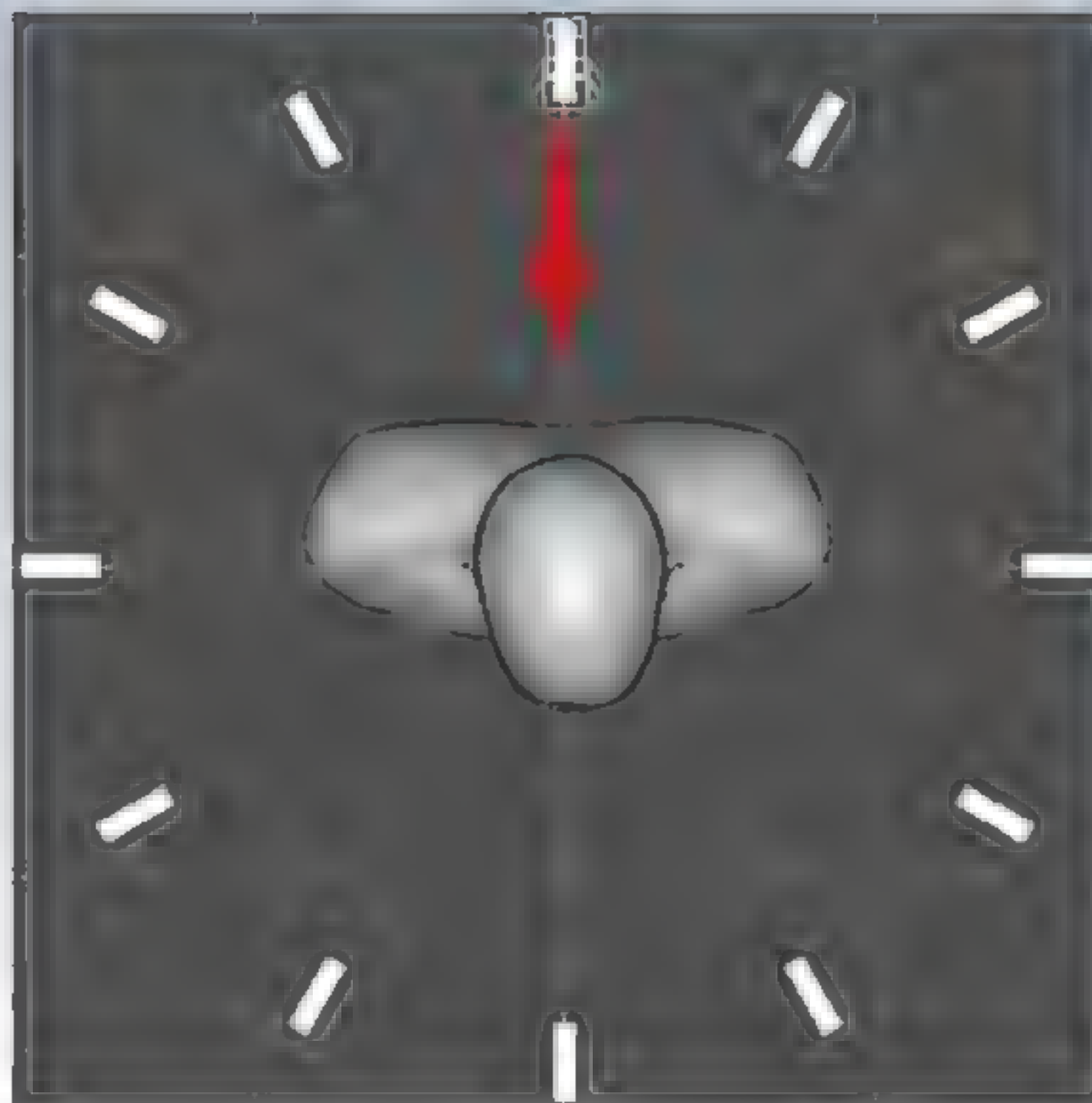
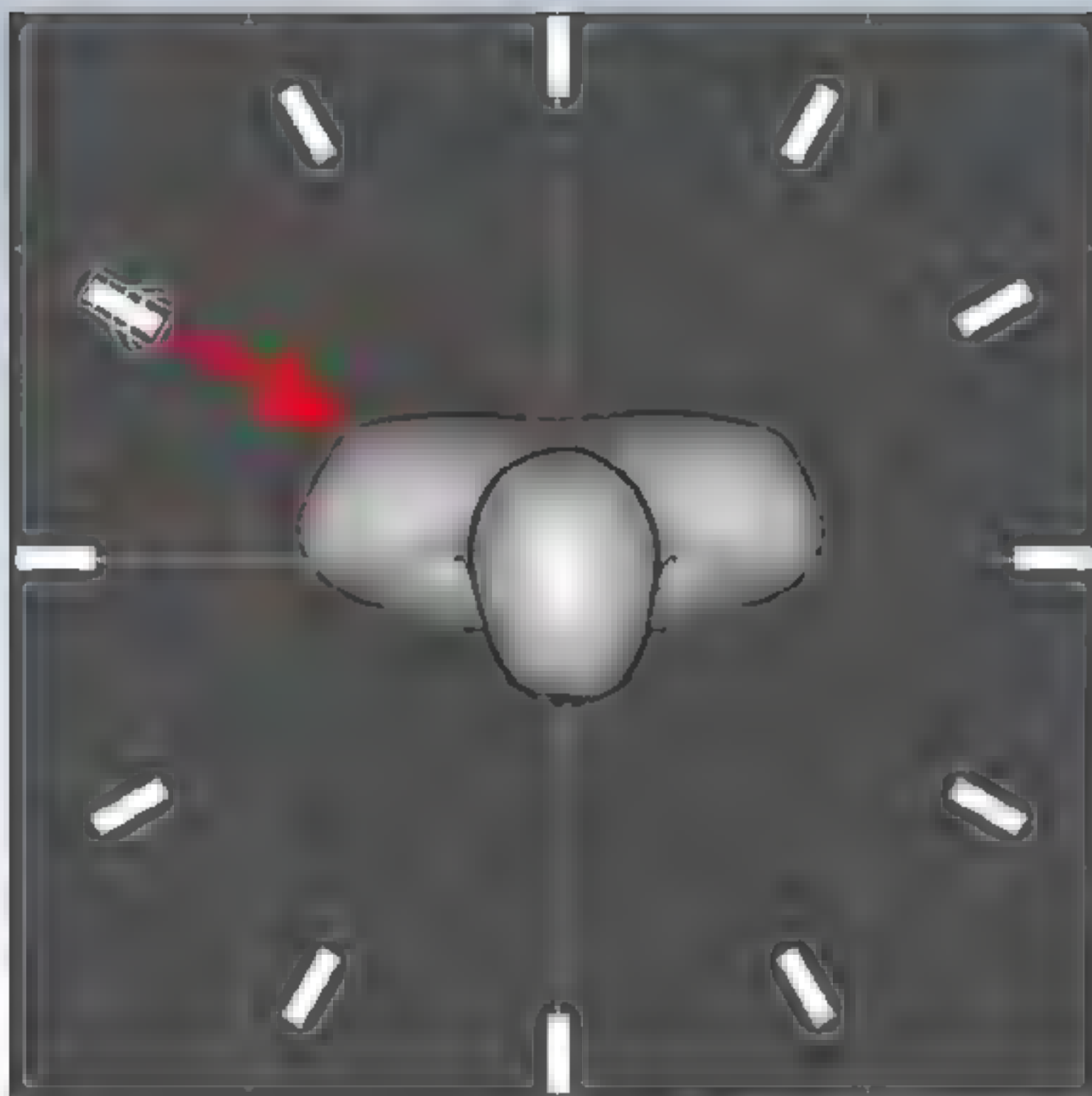
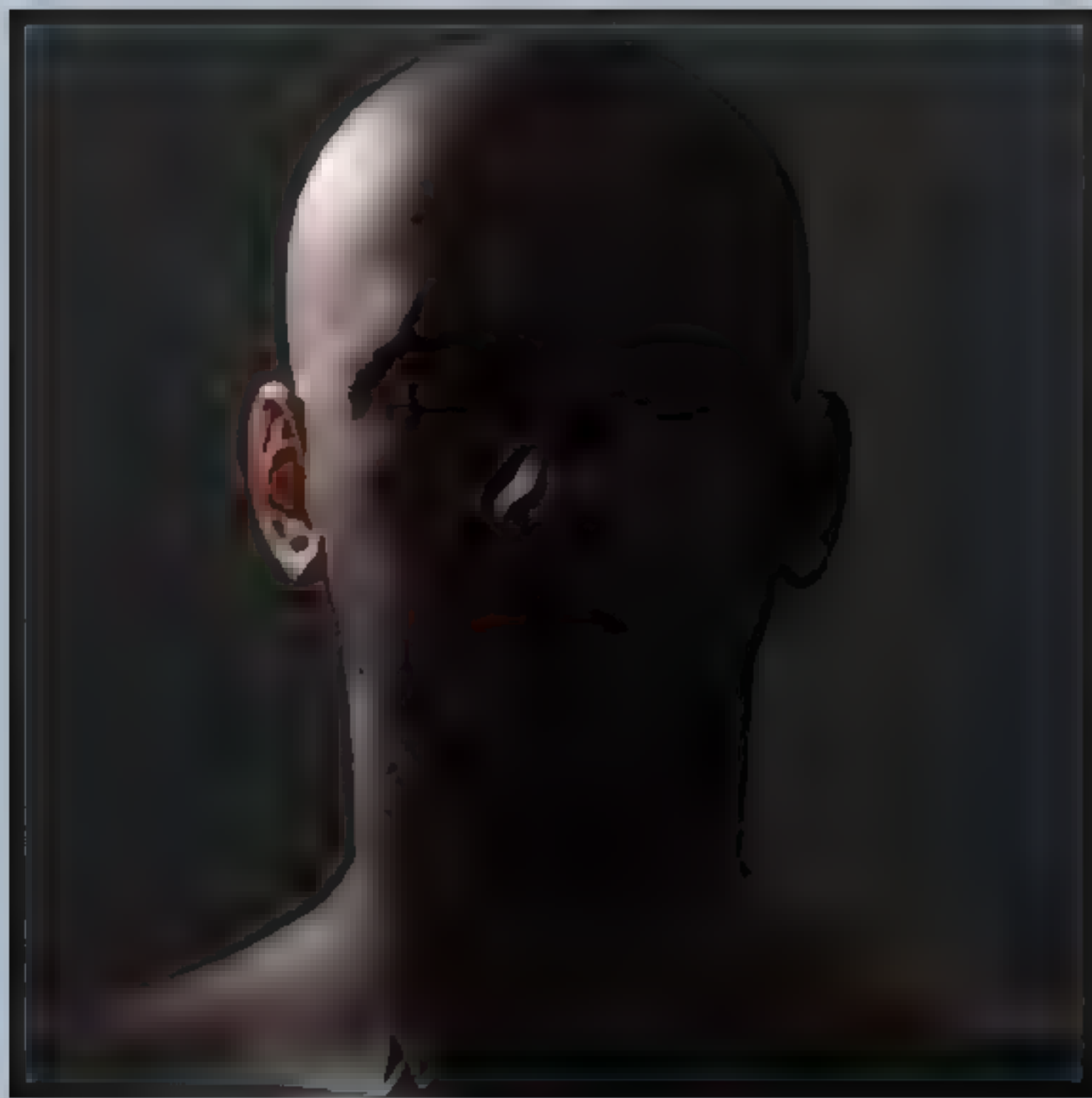


Lighting up time

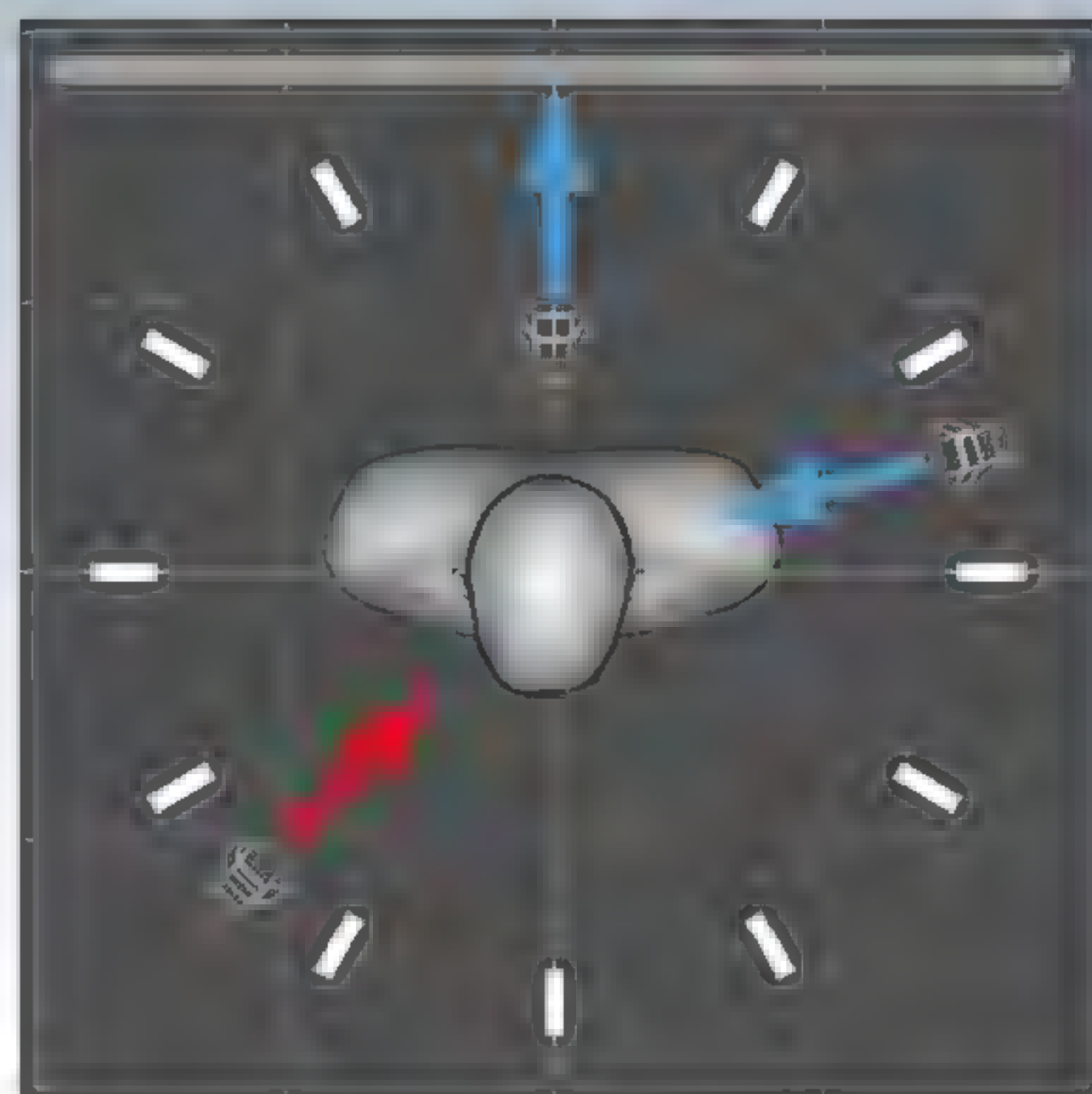
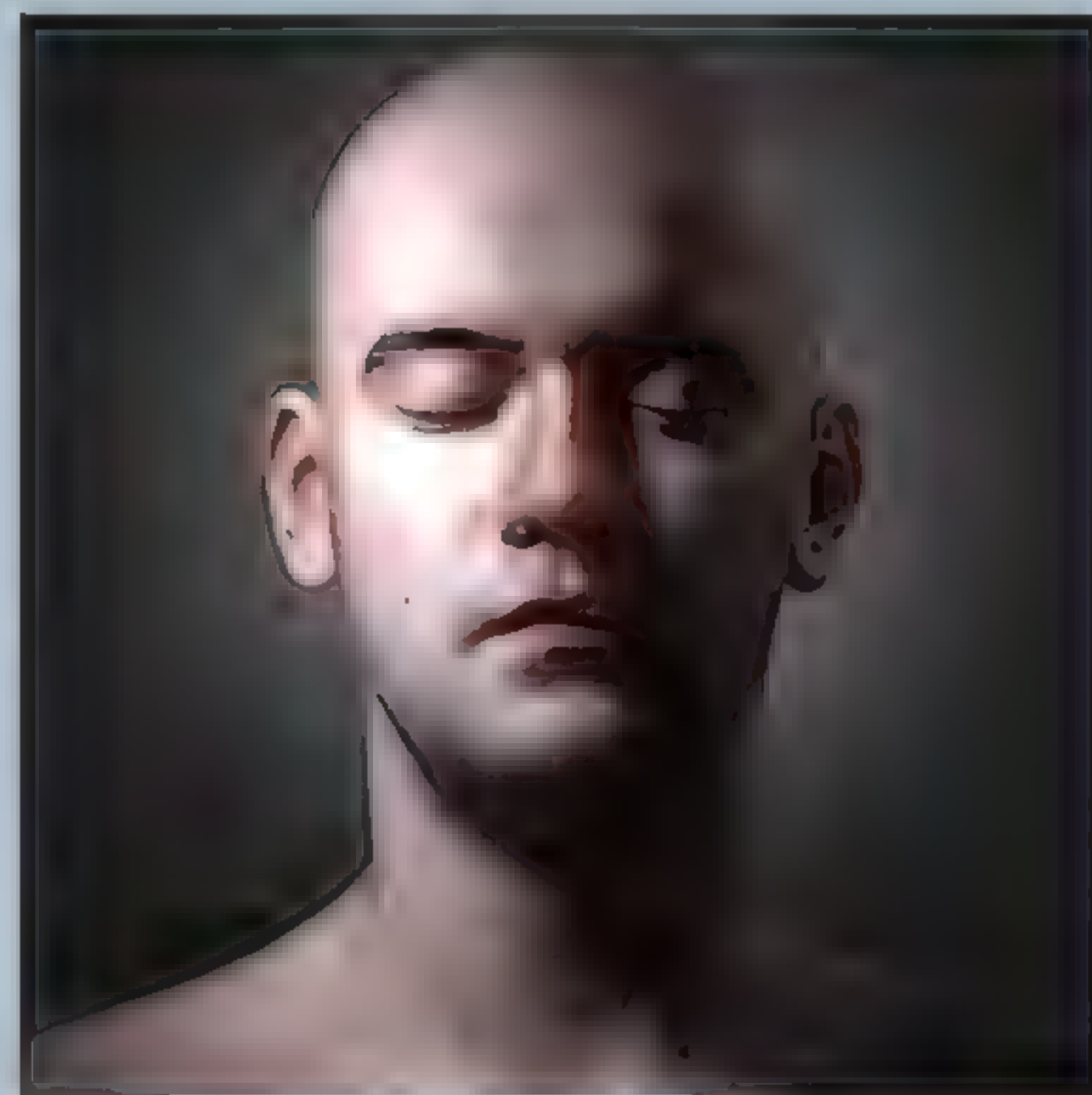
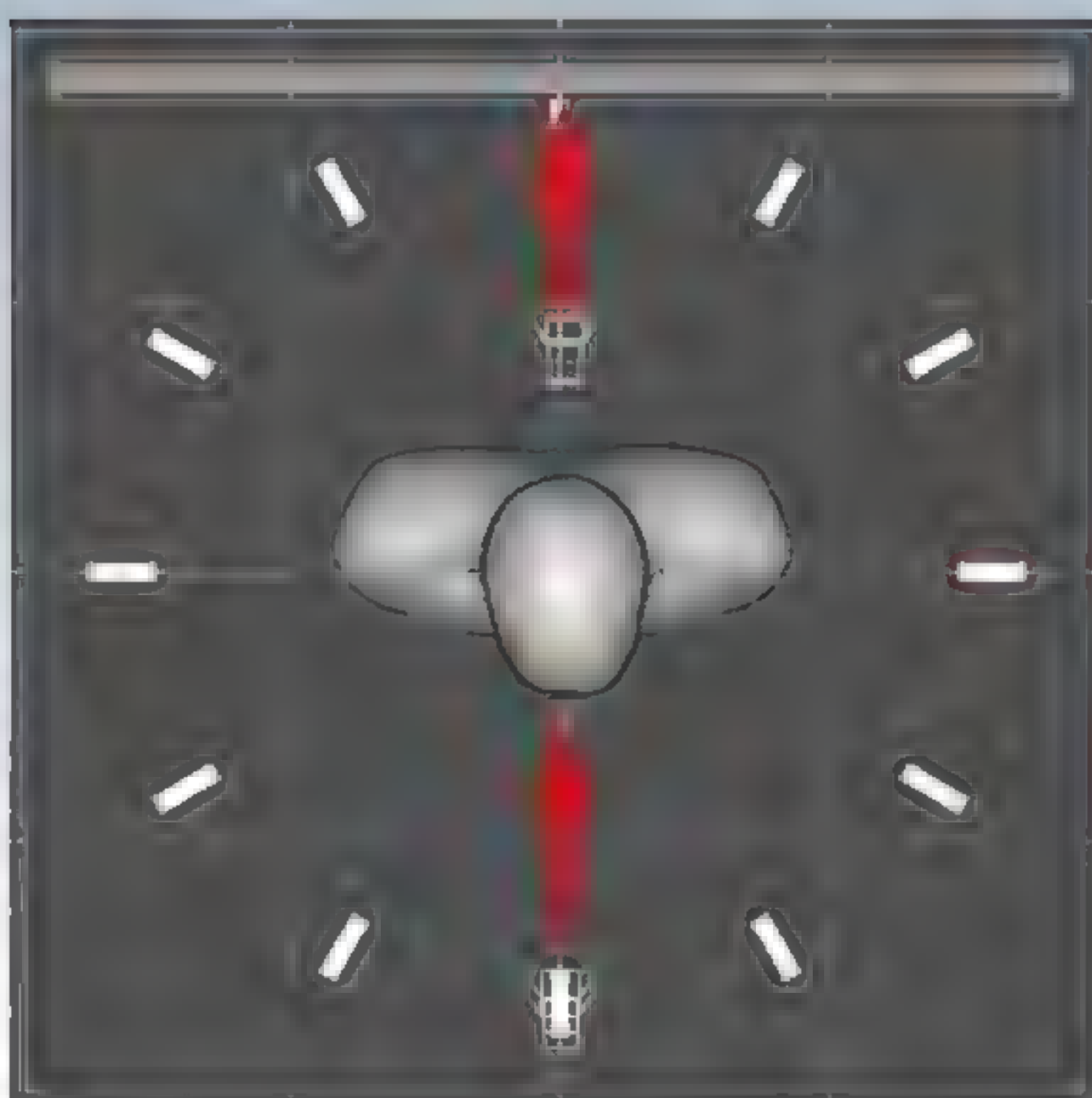
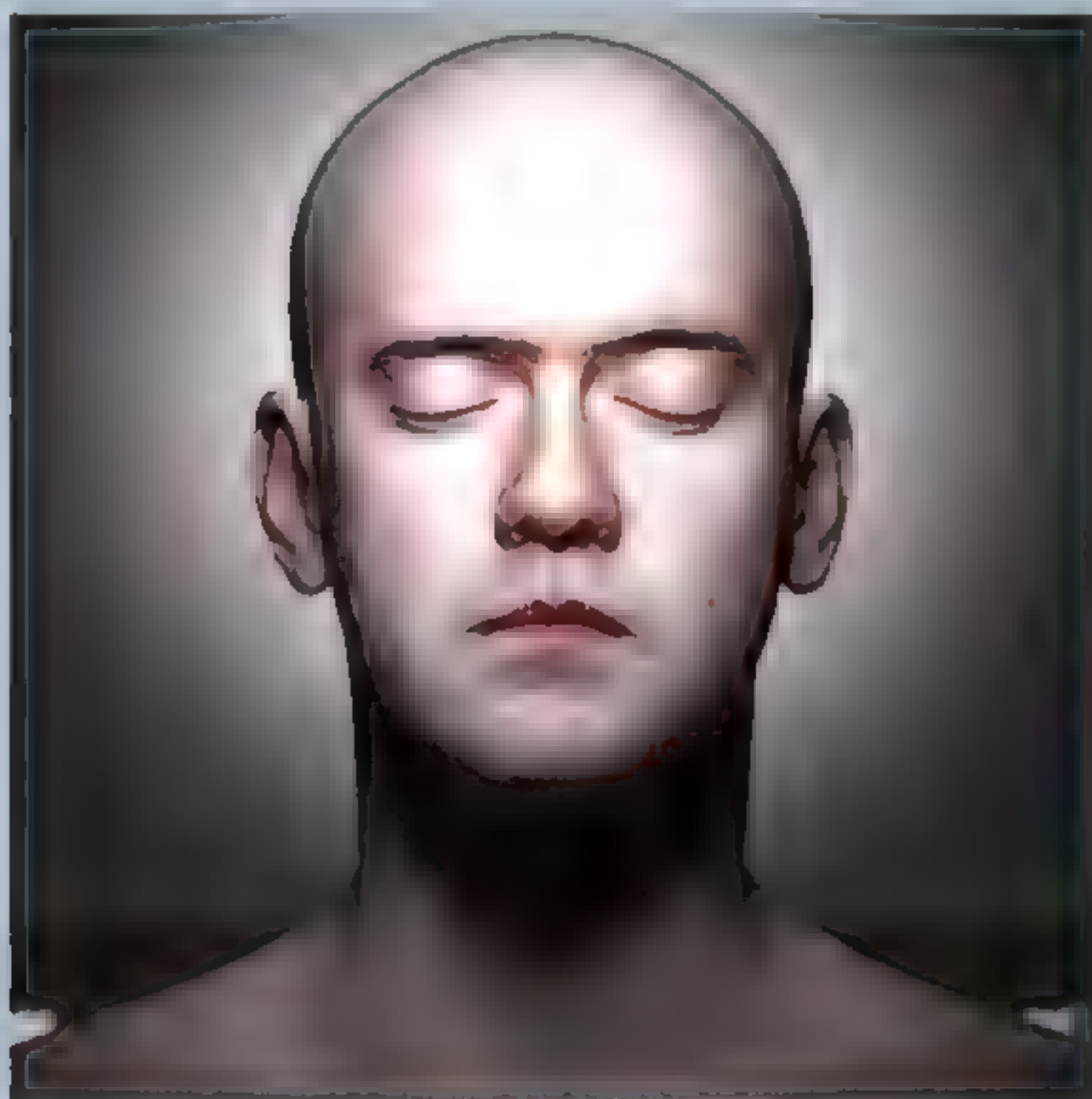
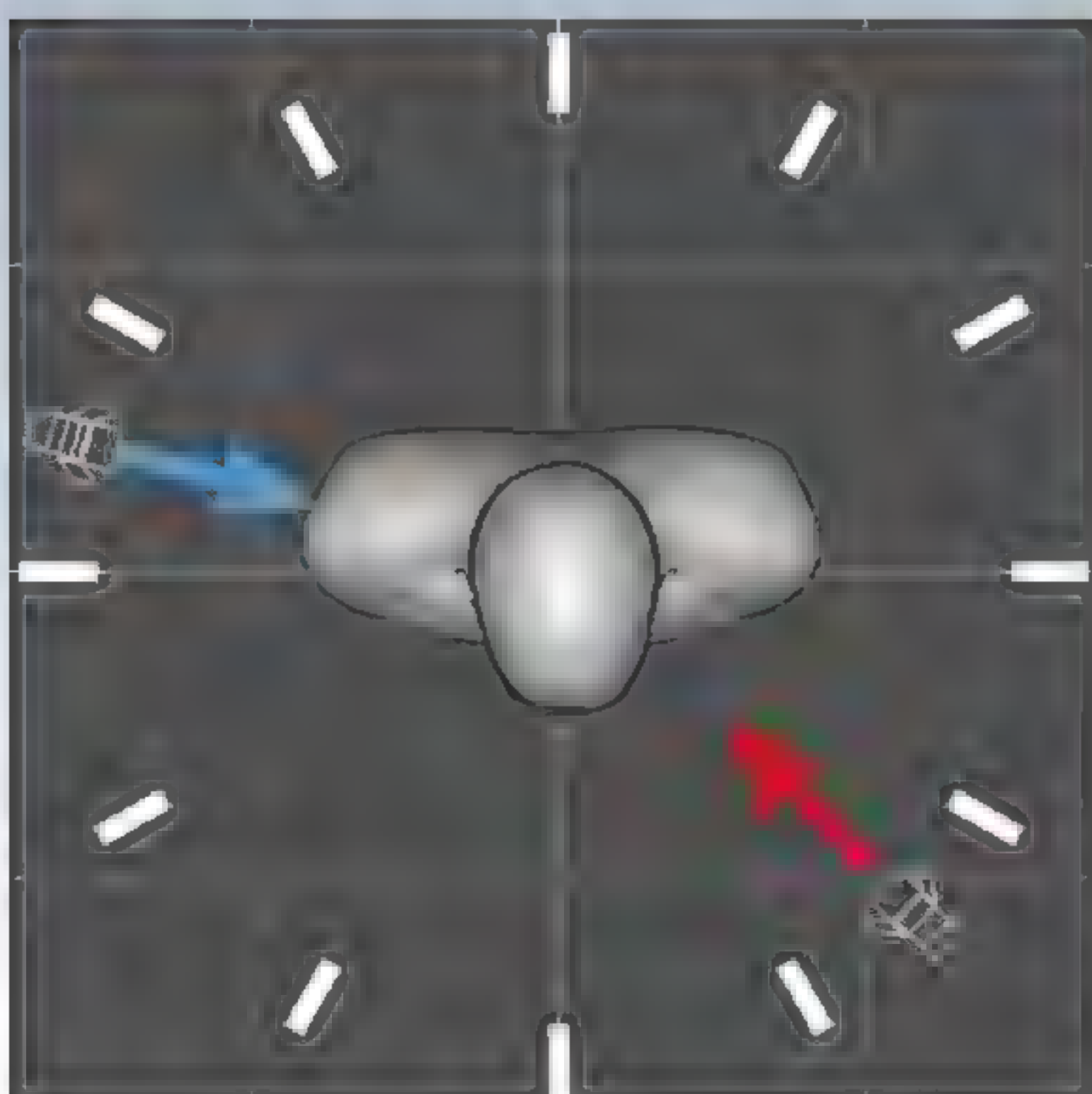
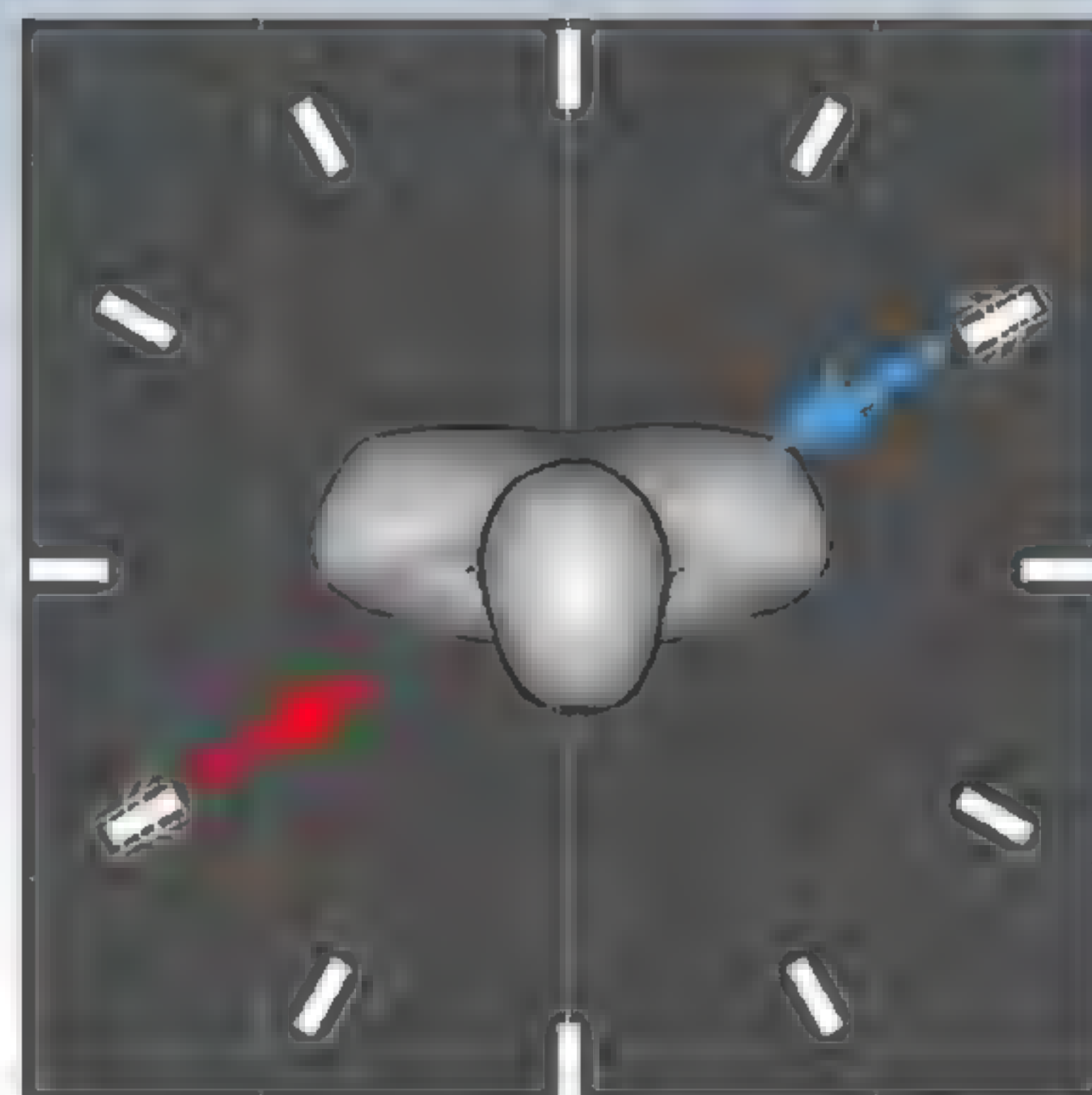
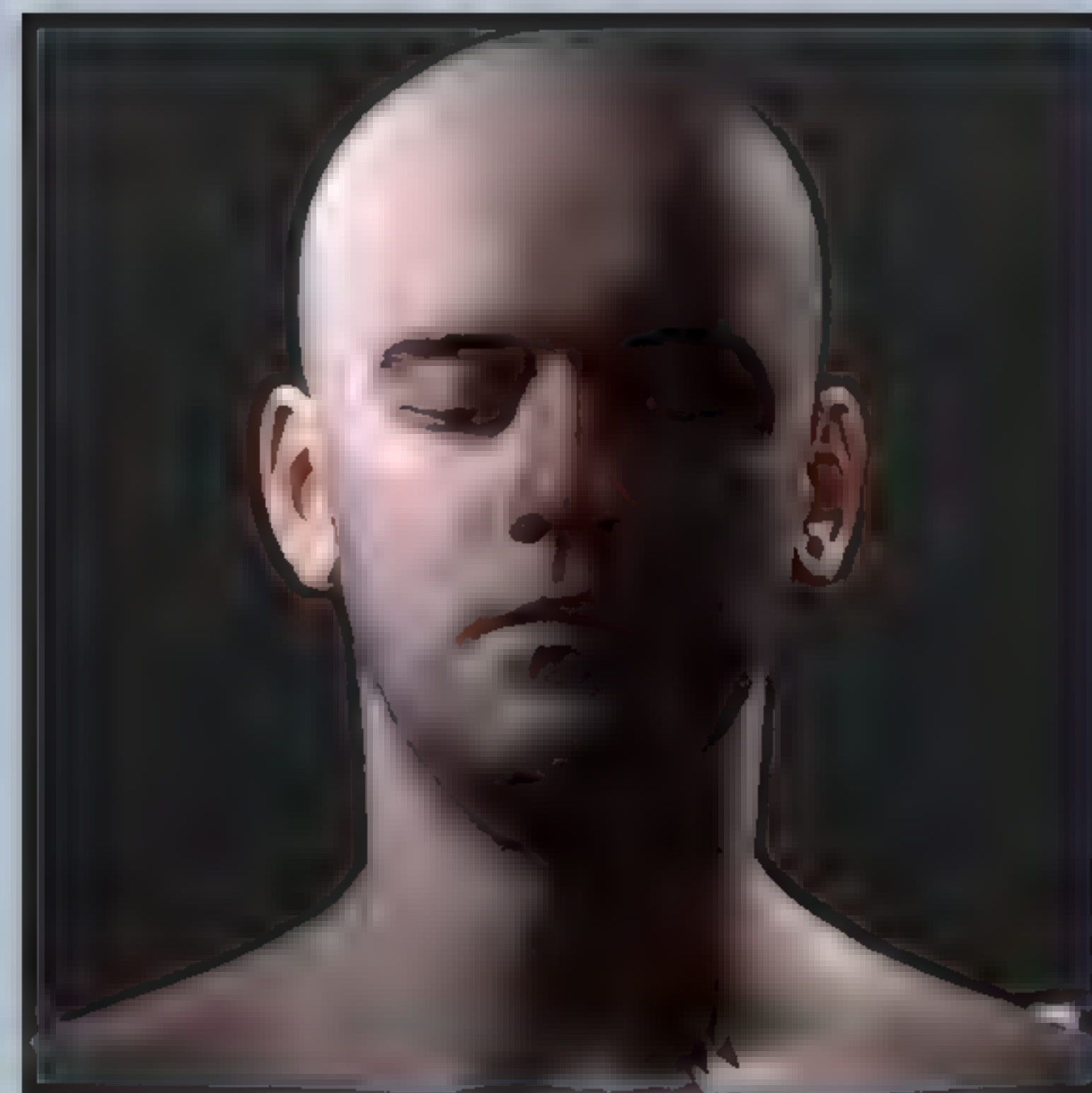
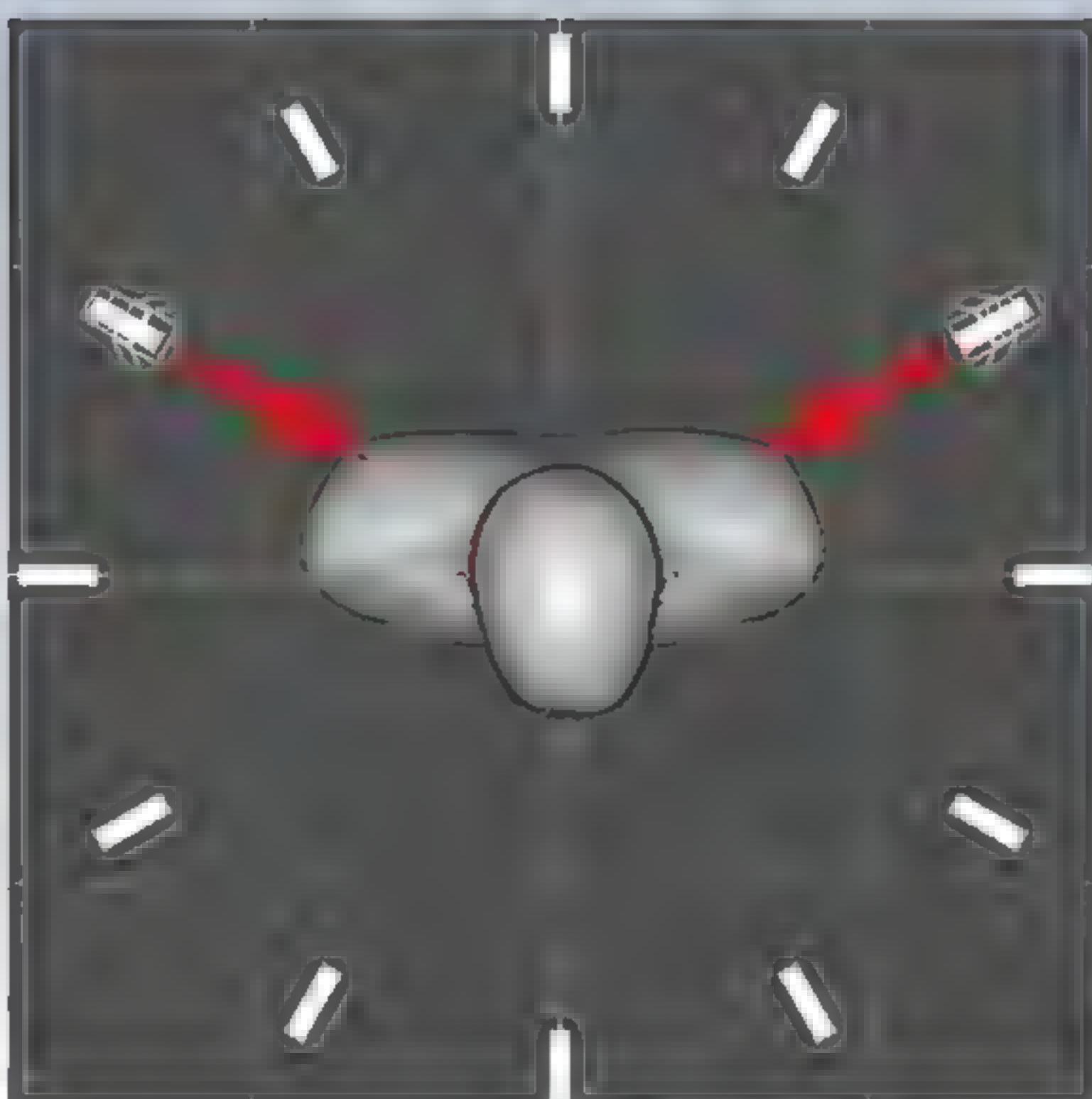
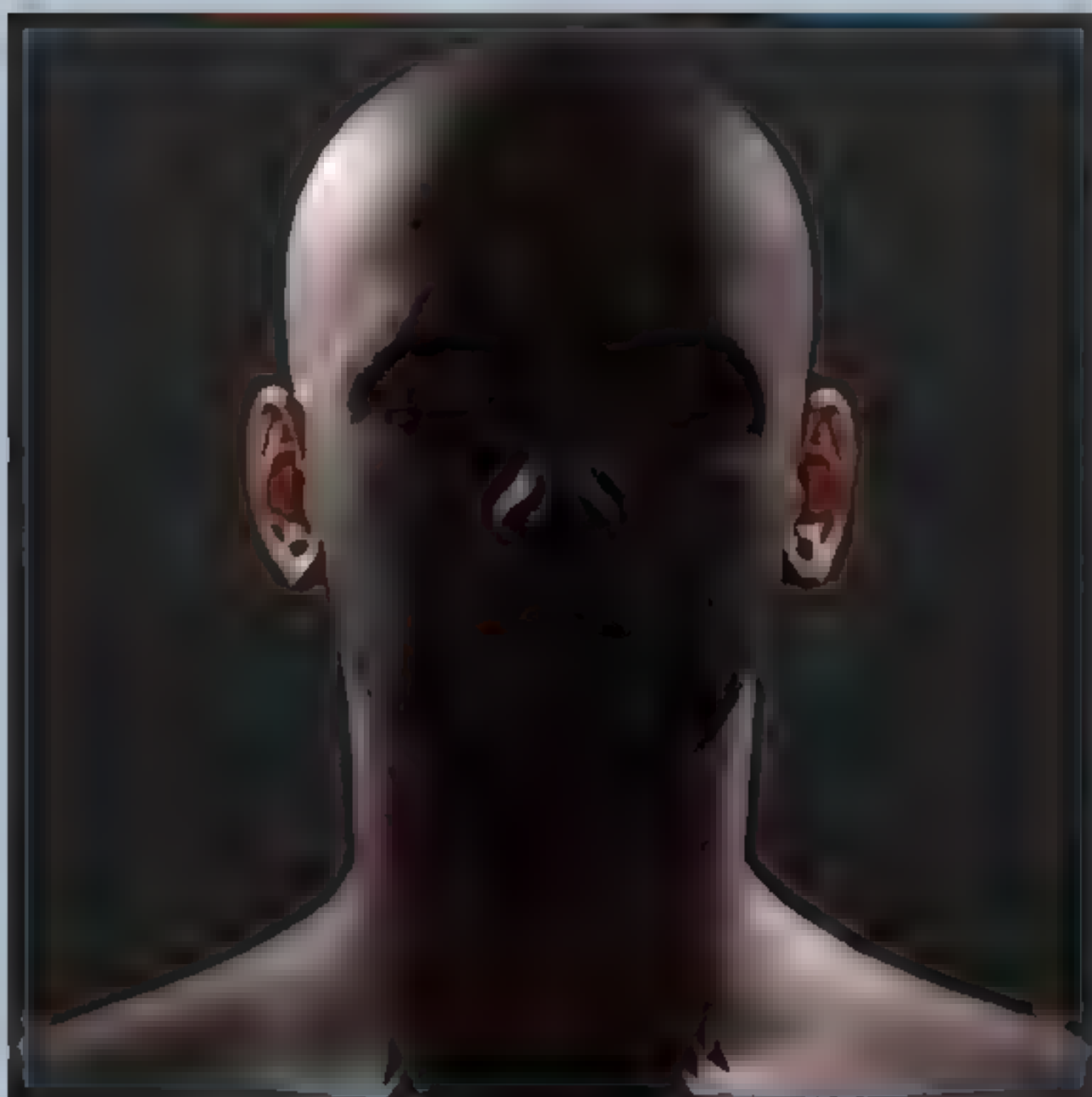
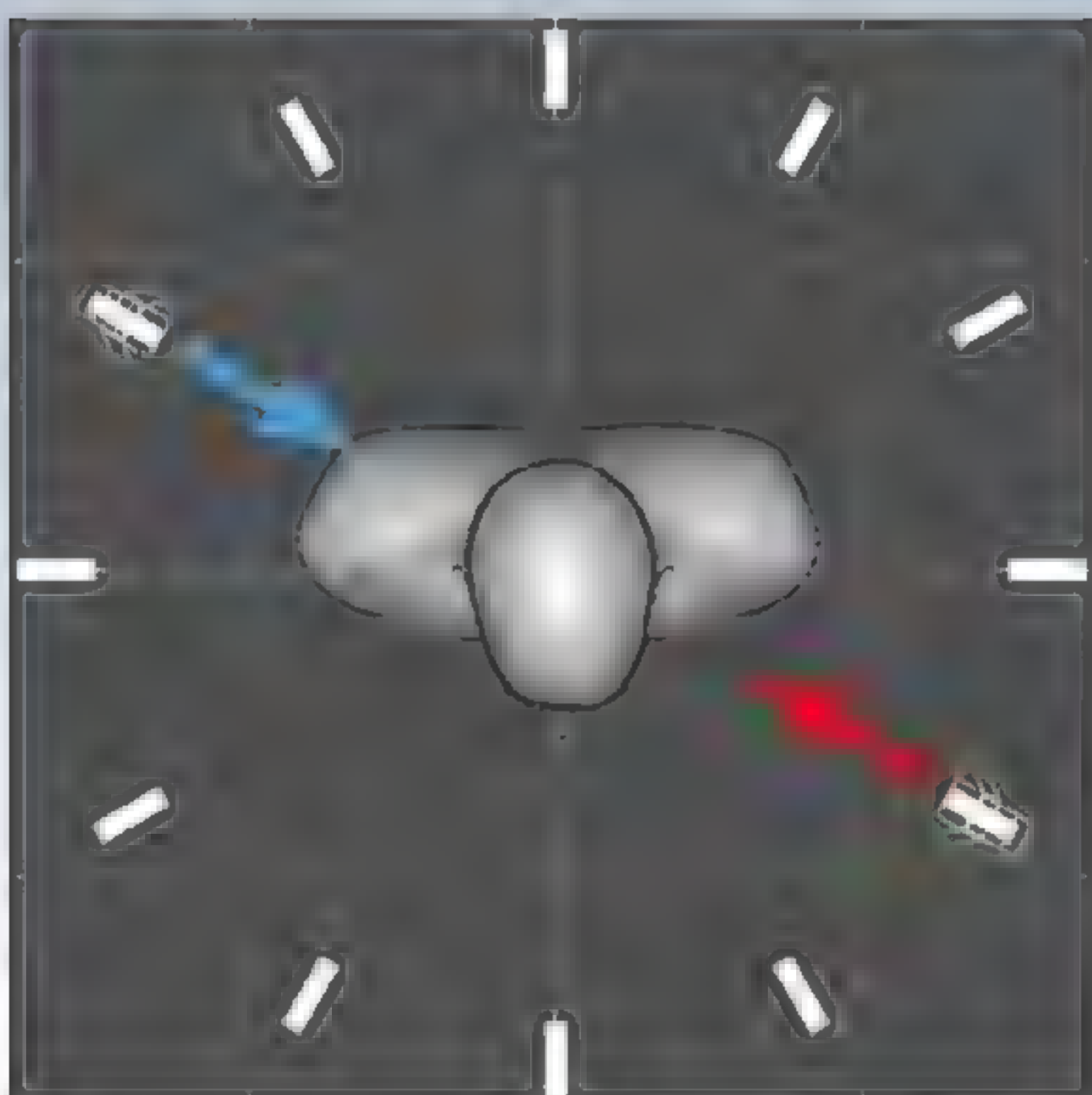
If you're new to portrait lighting then we have a little cheat sheet you can reference which shows a series of lighting setups and how the illumination will fall upon your subject as the angles change. You can use these as the starting point for creating your own lighting recipes. It shows the way light strikes a human head from various points around an imaginary clock face. The light is above head height and is pointing down at roughly a 30° angle. There are also some that show how two or three lights will interact with each other too. The diagrams also indicate which light is the key light, and which is the fill light. A key light is essentially the brightest source of light in the shot. A fill light is often used at lower power than the key light in order to lighten dark areas of shadow to make sure they don't go totally black. Further on in this issue, we also have a few more of the most popular lighting setups listed in more detail for your reference. Good luck and enjoy. ■



← Key light ← Fill light



← Key light ← Fill light





These images were lit with either a two or three light configuration with a key light, a fill light, and a light aimed at the backdrop to create a spotlight.



This set of portraits of Jess and Oli were shot using a very simple, and small, setup. The lights and backdrop were compact enough to sit in the corner of our lounge.



“Now, we’re going to cover the main topics for working with models on a fashion-style studio session.”

Model photography

Shooting in the studio with models

If you are new to photography in general or portrait photography specifically, then it can be a daunting prospect for any photographer who is new to the genre, to work with models and produce portraits in a studio. We’ve already covered how you can set up your own home studio and made a few suggestions about lighting technique. Now, we’re going to cover the main topics for working with models on a fashion-style studio session.



Next level

As a budding portrait photographer, you may already have shot photos of friends and family in your home studio but may now be looking to take it to the next level. It is not uncommon for photographers starting out in the world of portraiture to seek out aspiring models and actors who might want a set of portfolio images produced. Also, it is common for the reverse to be true as well. Quite often, it is treated as a mutually beneficial arrangement where no

money has to change hands. The end result is experience for the photographer, and portfolio images for the model.

The project begins

It was a similar situation for this project. We wanted to do a studio shoot and produce an article about it for this bookazine, but wanted to try and keep it on a very tight budget, much as any budding new photographer would want to do. As luck would have it in these situations, it was a friend of a friend who came to the rescue.

We were fortunate enough to get in touch with Eunice Matthews, who is a highly regarded local hair and makeup artist. She has worked with many people and knew of a few aspiring models that might be interested in being involved in the project as they were looking for portfolio shots.

The planning stage

We set up a meeting with Eunice to talk through the project and what we felt we could achieve on a shoestring budget.



Team photo. Before we started with the business of the day, we set up a quick group shot of all the people who gave up their time to help out and make the shoot such a fun experience.



We also looked through Eunice's portfolio of young female models who might be suitable for the shoot. We knew we wanted to have professional hair and makeup, and Eunice was happy to help us out. We had also decided we would like to get a young adult male in the project too. Once again in that fortunate way things happen, one of the directors of this magazine's publishing company knew of a friend whose son, Jamie, was looking to get some headshots done.

Decision made

We settled on Courtney as our female model and Jamie as our male model. Eunice would come in and provide hair and makeup. Our theme was going to centre around both colour and black and white images that would attempt to pay homage, in our own limited way, to the style of the contemporary Chanel or Dolce & Gabbana magazine adverts. We did some image research, looked at clothing choices and created a basic shot list, so we had an idea of what we would attempt on the day of the shoot. Both Courtney and Jamie were immensely helpful by being able to bring clothing items that suited our needs. Both our models were not trained professionals, so we knew we had to keep everything simple. They would be doing work solo and also as a couple, which can be daunting.

Don't be afraid to have lots of reference to hand. A tablet with a selection of images to give inspiration will help both photographer and model when searching for that perfect pose or idea for lighting and composition.



Reference material

In order to maximise the time we had available with our models, we researched and gathered a series of images that we could use as reference when it came to posing our models on the day. If photographer and model are new to fashion or glamour style photography, then having something on hand to kick off ideas is no bad thing. We had a series of images loaded onto a tablet which we could call upon when needed.

Somewhere to shoot

This was not going to be a photo session that could be housed in someone's lounge or kitchen. The fledgling photographer will face the same issue when attempting a larger scale shoot. The problem is, where do you go when you don't have a studio? We faced the same issue, but our local area has a number of community centres that offer their rooms for functions and parties. A few phone calls later and we had a venue for the day that had plenty of room as well as kitchen and bathroom facilities for £10 per hour. We had our models, we had hair and makeup, we had our venue, shot list and props. We were ready.

A simple grey paper backdrop creates a floor and a wall, and serves as the studio environment. The example we used is a mid-grey roll 3m wide.



The AlienBee and Einstein monoblocs, manufactured by Paul C Buff, are robust and reliable. The 640WS versions are also very powerful.

Setting up

Our makeshift studio consisted of a 3m wide mid-grey paper backdrop which could be rolled out to create both a floor as well as the background. Grey is often a good choice as it can be lit with a strobe to brighten it to white if needed, or it can serve as a dark background when not illuminated directly with any lights. The flash units themselves were AlienBee monoblocs and Einstein units. They are powerful and robust, and their power output can be altered to a very large degree. They also have modelling lights built in which enables you to gauge where light falls on your subject before you take the shots. We also had a number of light modifiers in the form of soft boxes, shoot through brollies, and reflectors. Our key light, which was set up on the right of the camera was actually going to shoot through a scrim. A scrim is basically a sheet of material, usually white, when lit from behind, can be used as if it were a bright window. It also has the benefit of producing softer shadows because it is a larger light source than the flash unit that created it. Another light with softbox attached was positioned on the left of the camera, behind our subjects, to act as a fill light to brighten areas in deep shadow, or alternatively, be aimed at the backdrop to make a spotlight effect on the grey paper background.

The scrim is basically an analogue of a bright window. A white sheet is lit from behind, and the large surface area creates a soft illumination that is ideal for portrait photography work.

This is a simple diagram showing the basic setup we used for the majority of our shoot with Courtney and Jamie. The key light on the right is shooting through a scrim, and a fill light was placed on the left to control the depth of shadow.



The Canon 1DSMK3 is quite an old camera now, but it still has great image quality and fast auto focus. Good examples can be bought second hand for less than £1000, which is great value for this one time flagship model.

Camera and lens

For our shoot that day we were going to use a canon 1DSMK3 with a 24-105mm f/4 zoom lens. This at least gave us some framing options as we were planning some full body shots as well as head and shoulder shots. After a little experimentation with lighting power and camera settings we got ourselves dialled in. The key light shooting through the scrim was at about 3/4 power and the fill light was set about 1/4 power. The camera settings were an aperture of f/6.3, shutter speed 1/160 of a second which was the max sync speed we could get with the wireless trigger we were using for the lights, and an ISO of 100. It was time to start.



Makeup

Eunice Matthews, our makeup artist for this photo shoot, gives us an insight into the world of hair and makeup, and passes on the benefit of her experience in this field:

'A career as a makeup artist is lots of fun, rewarding and like most creative paths it can be hard work to begin with. I remember as a five

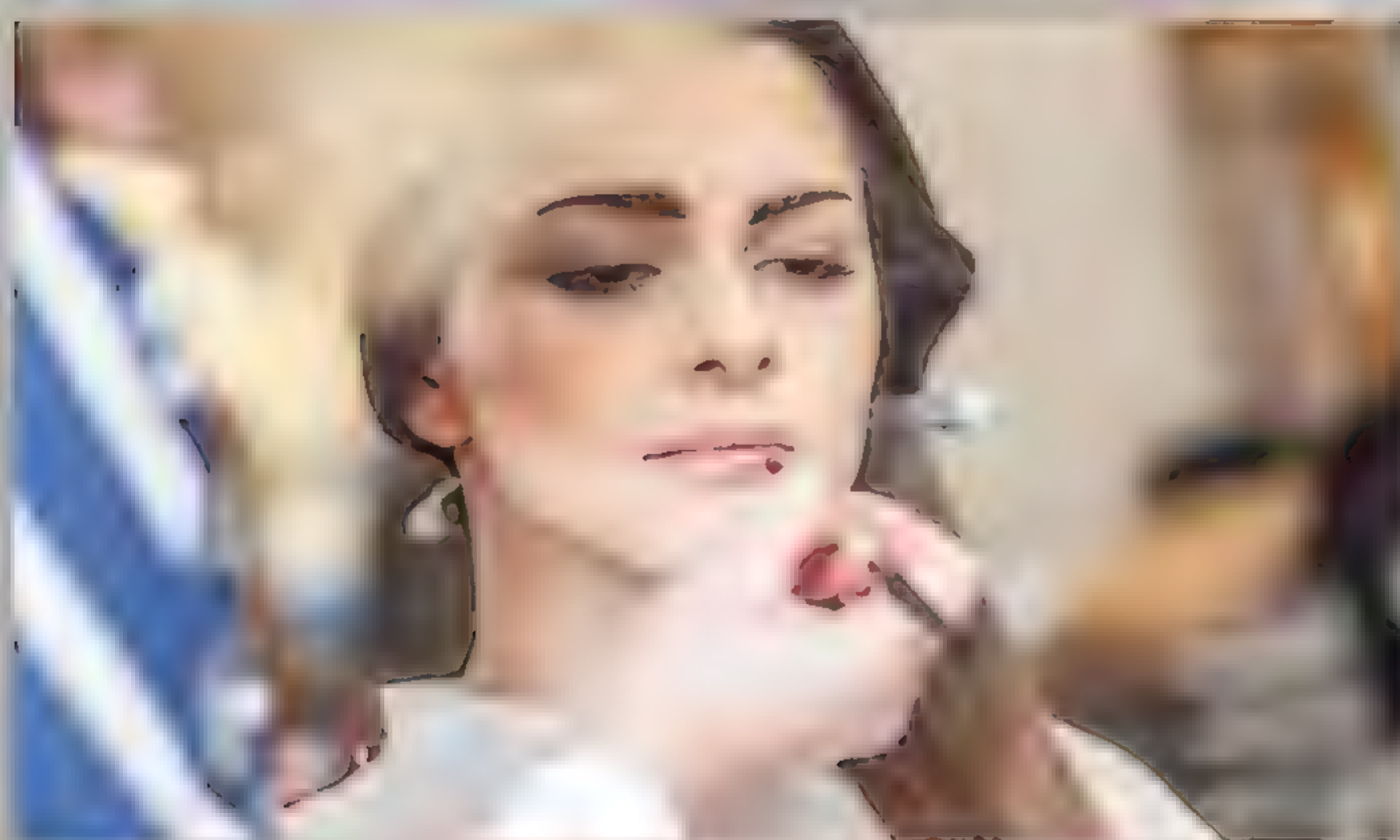
year old, I always loved painting faces - mine and other people's. It's the transformation which most appeals - a real mood changer. One can go from demure to vamp to cute or sassy just with changes of colour intensities and tones. The options are endless!


Going back to 1998, I was already a qualified hairdresser and beauty therapist but was approached by a cosmetic company to join their company. They trained me to do what I do, and I then trained others which was rewarding to see others flourish and grow in confidence. The main 'bread and butter' income as a makeup artist used to be wedding work. There will always be a steady flow of brides, bridesmaids, mother-of-the-bride, friends and family to leave looking

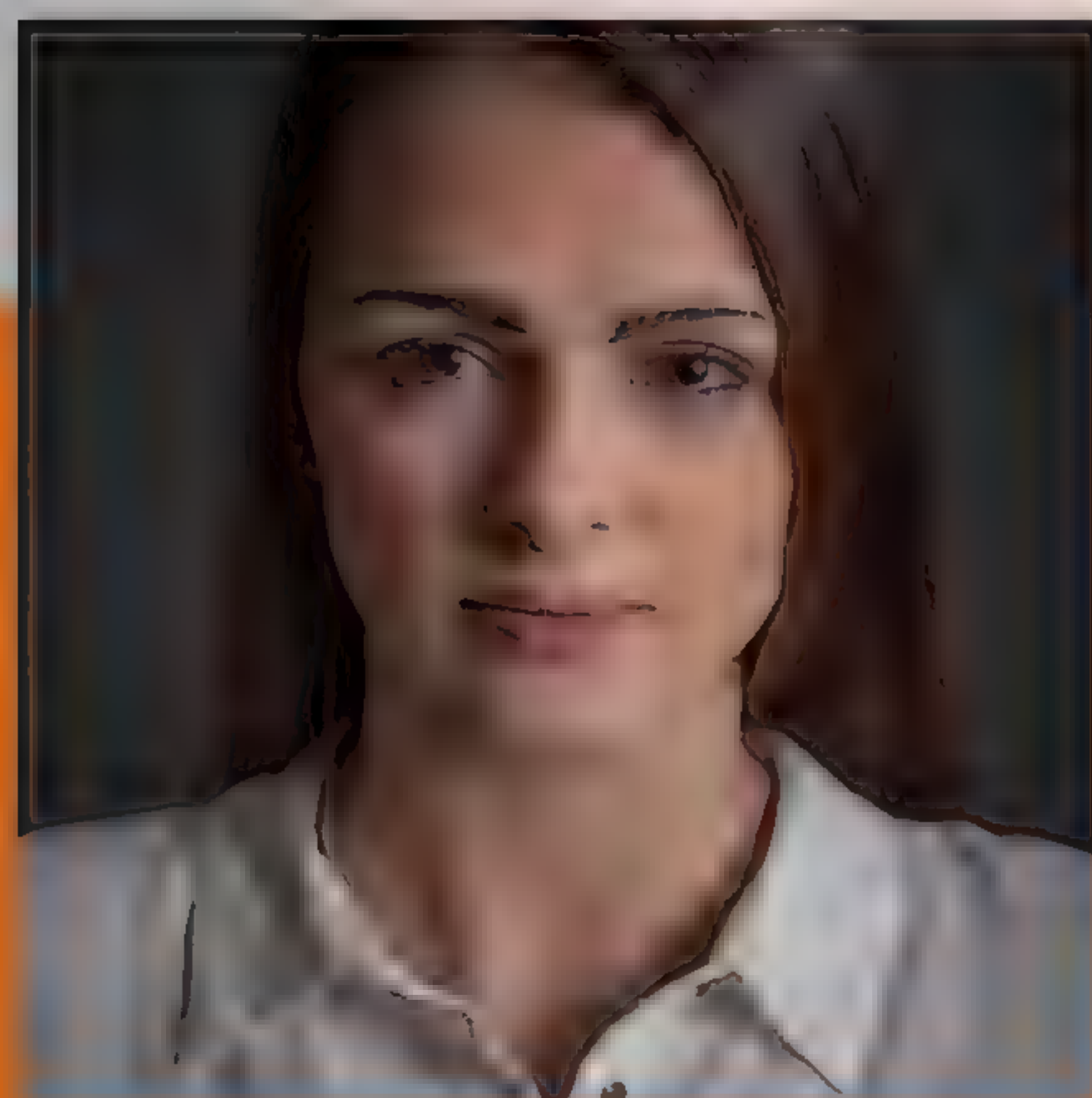
gorgeous and special. Nowadays, makeup isn't seen as a luxury - it's an essential. Bookings for parties, proms, hen nights, christenings are plentiful as are conducting makeup lessons; teaching women wonderful skills to last a lifetime. Then there is the exciting work of being part of an artistic team on photo shoots and for this you will need to be flexible and self-sufficient or even design the makeup look to follow a brief. Confidence breeds confidence so get stuck in and acquire as much experience as you can.

So, how to get started? You could start the way I did - there are many cosmetic companies who offer on-the-job training. Then there is the college route. Key in all of this is to compile a portfolio so always have your own camera as part of your kit. Take before and after shots. People cannot see your skill if you have no evidence, right?

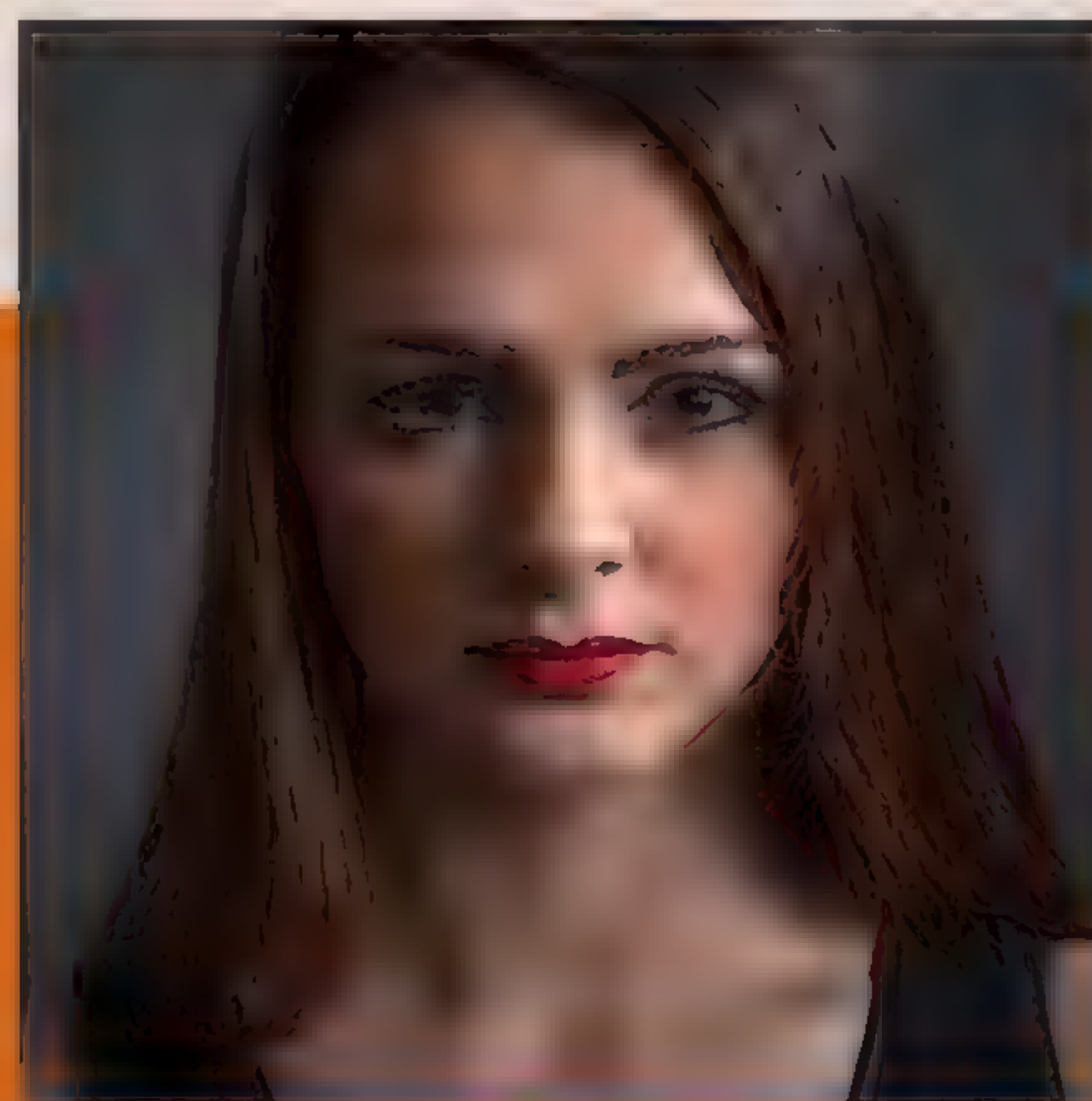
There is no secret formula to becoming an 'in demand' makeup artist. A lot of hard work and determination, a willingness to get along with people and most importantly having a flexible 'can do' attitude will see you in a rewarding, fun career stretching out ahead of you.'



Visit Eunice at: www.eunicemakeup.com  Follow her on Facebook: Eunice Makeup



'Turning attention to the models for the photo shoot in this magazine. We had the gorgeous Courtney and we needed to create several looks. Starting with a natural look with soft neutral colours and 'barely there' lip colour. Then there



was a classic look with more colour and depth to achieve a classy but not overdone 'meeting friends for lunch' look. Finally, the dramatic look with dark contrasting colours. Obvious, deep tones to accompany the LBD (little black dress).



Jamie needed a manly look; we didn't want to feminize him with too much obvious makeup. So simple skin prep with a touch of foundation, a dusting of powder to take away shine, minimal blush and a tiny amount of mascara and lip colour.'



A few words

We had a quick pep talk at the beginning, took a team photo of our group and made a start. Jamie was first in the makeup chair. Whilst he was in makeup, we did some reference shots of Courtney and got our lights and camera dialled in. Once Jamie was ready, Courtney went off for her hair and makeup. Courtney was going to need more time for her first makeup session.

Going solo

We did a solo sequence of shots with Jamie and went through some simple poses and a couple of clothing changes, referring to our tablet computer if we needed any guidance or inspiration. Although never having modelled before he was quite a relaxed character and nothing fazed him. We used a subtle version of what is referred to as 'broken down' poses. Essentially, modern fashion photographers pose their subjects like broken marionettes with very

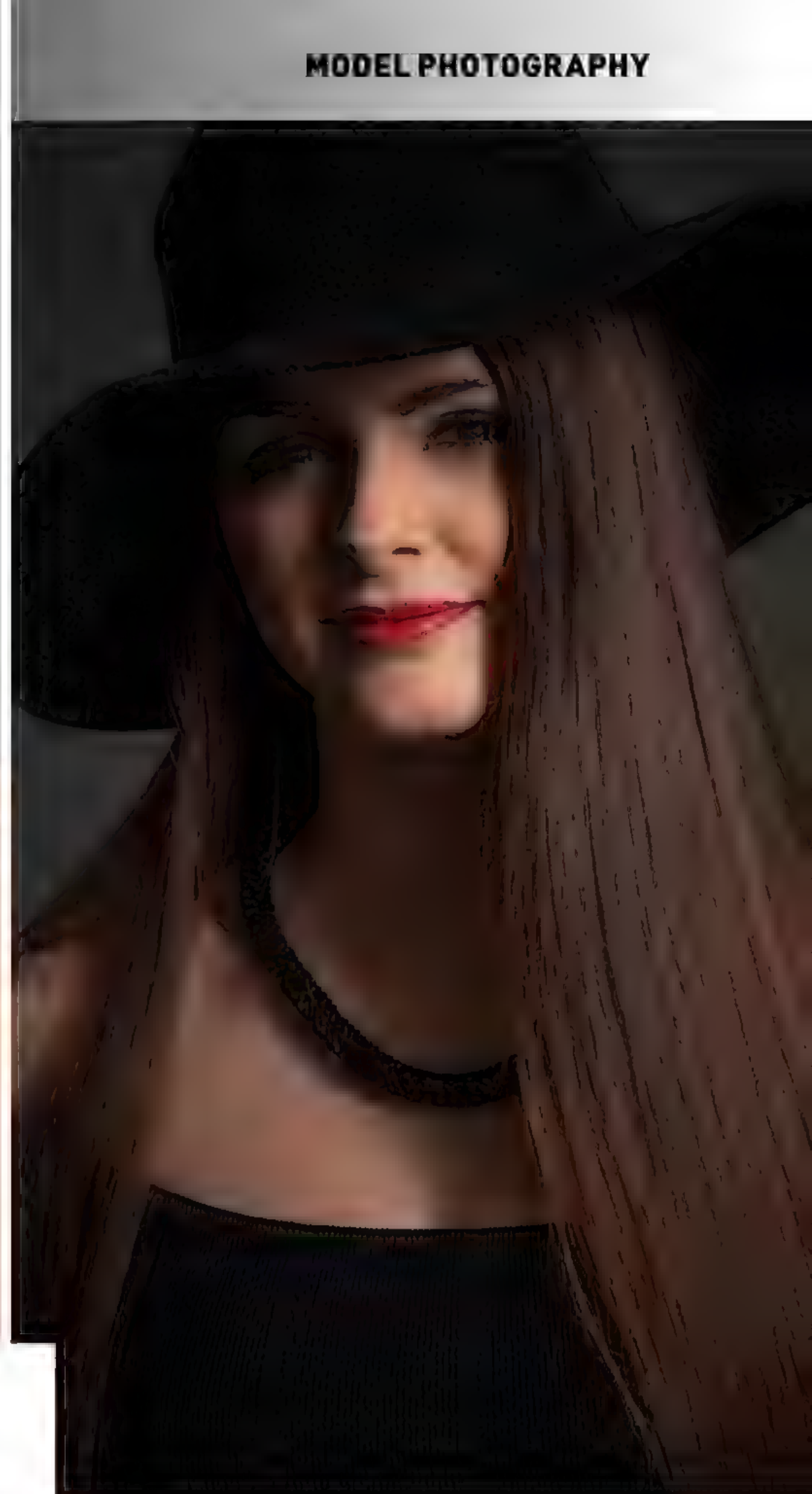
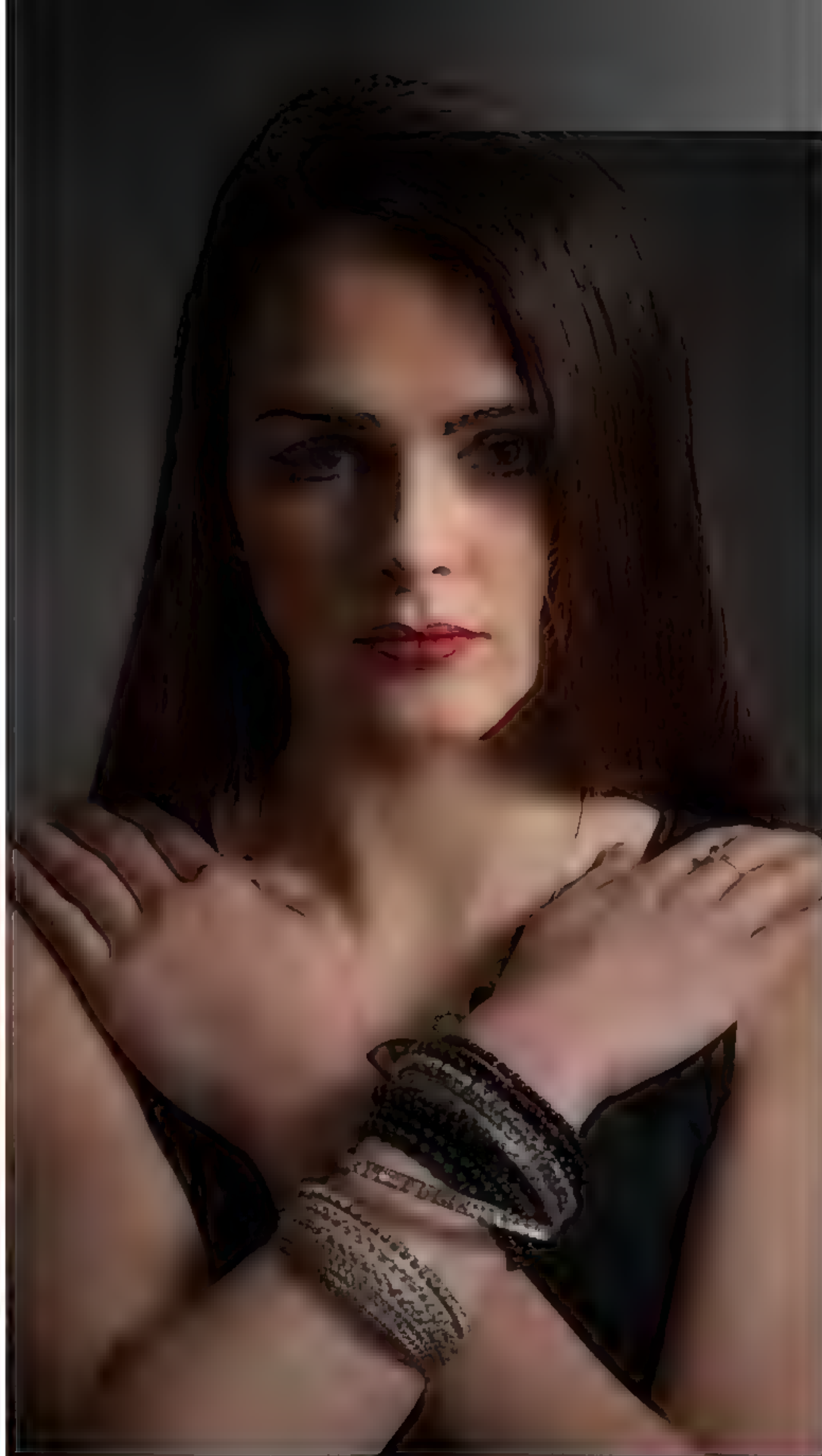
angular and sometimes odd limb and body positions. We had opted to keep it much simpler, but made sure arms or legs were in poses that created angles. We had head turns, looking up and down, leaning poses, kneeling and sitting, just to avoid a rigid 'police lineup' feel to the shots.

Eye contact

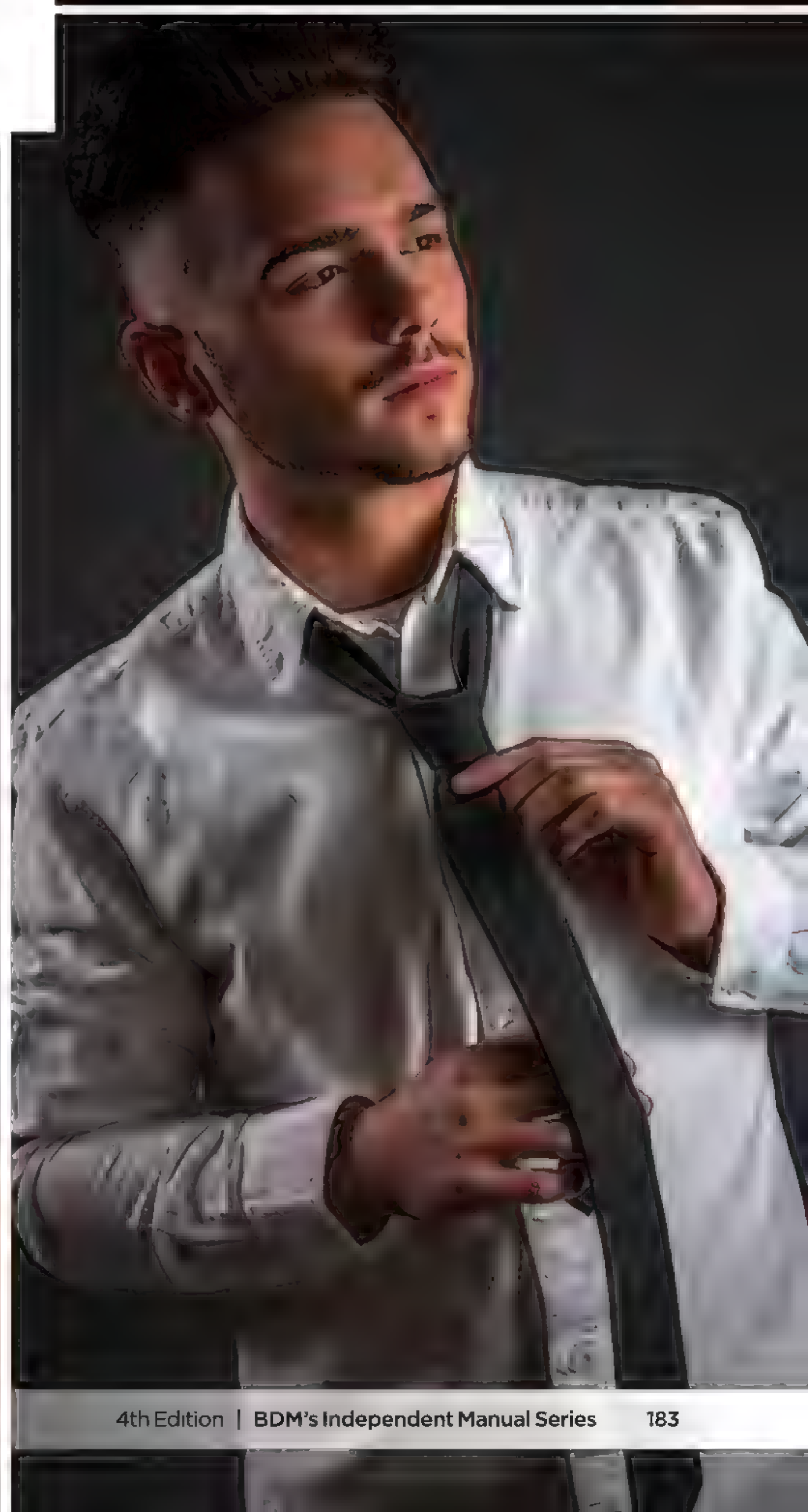
We also did shots where the subject is either engaging the camera with direct eye contact or looking away. In either case, the point of focus was always the eye nearest the camera, regardless of whether the eyes were open or not. We also had some simple accessories like ties, glasses and hats for our models to interact with. We kept Jamie's face quite neutral or 'moody'. If by any chance there was a giggle or silly moment, then we would capture that moment too.

Next up

When Courtney was ready, we started her solo set. As with Jamie, we went through a series of simple poses to get warmed up. Courtney was a little nervous, but she knew Eunice and her mum and sister were on hand to lend support. It's always good to talk to your models as you shoot, and it is also a good idea to take small breaks and show them some of your shots on your camera's LCD screen. Talk through them, get some feedback, and make sure they are comfortable. These kind of sessions should be collaborative and you should invite ideas and try things out when suggested. We did a series of poses with Eunice on hand to arrange Courtney's hair or take care of any on-the-spot makeup requirements. We tried to keep Courtney's poses softer than Jamie's. Absently touching her neck while looking at camera, or running the fingers of one hand through her amazing long brown hair.



If you are working with subjects who are not actually trained as professional models, the one thing that can often let a portrait down is how they pose. A simple solution to help get your models looking a bit more natural and relaxed is to give their hands something to do. From tightening a tie, holding a scarf, or pushing their hands through their hair and interacting with props, it all helps.





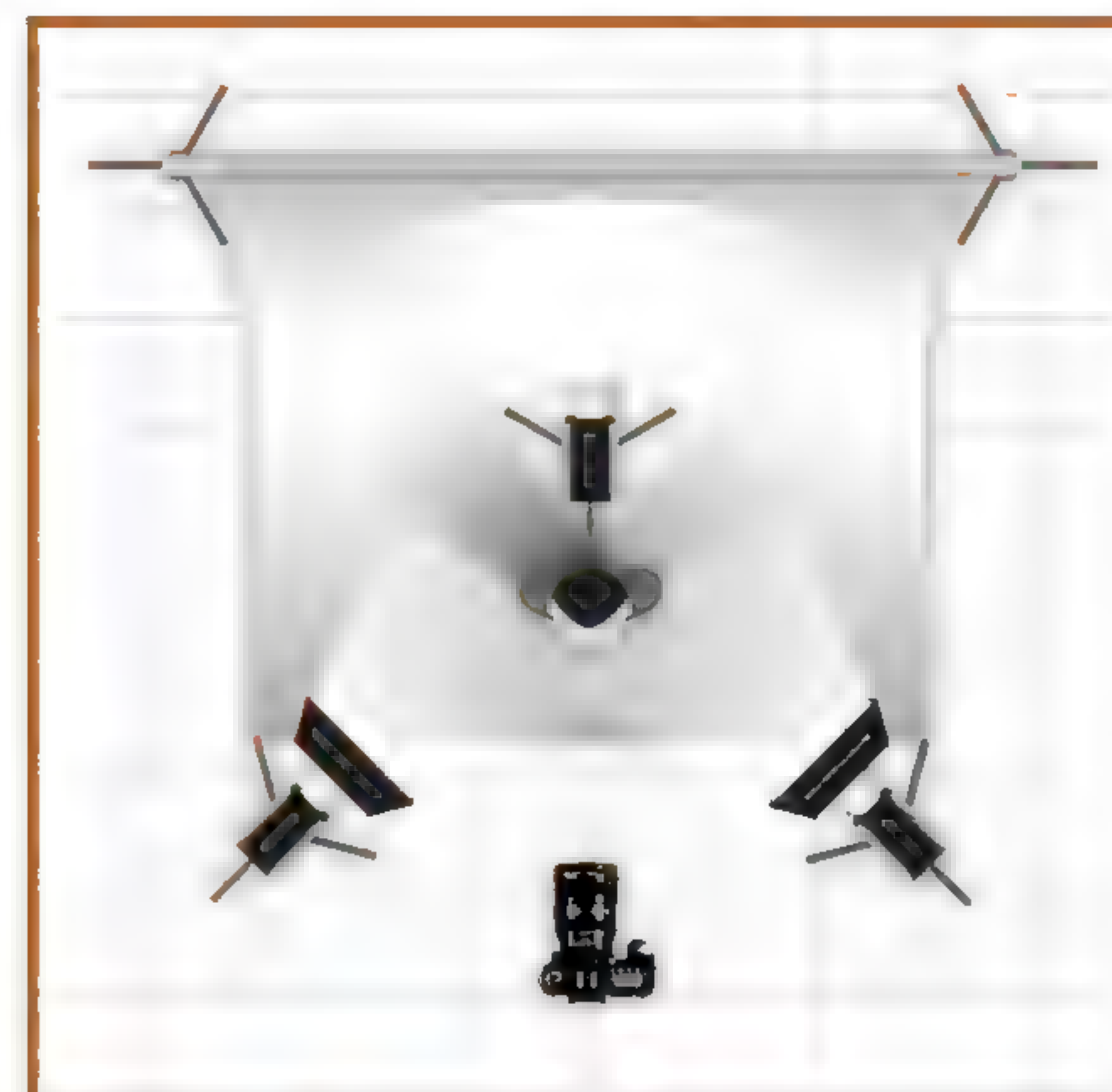
Moody portraits can often look fantastic if converted to black and white. Part of our thinking was to try and emulate the Chanel and Dolce & Gabbana mono advert style, a number of shots were converted in Photoshop using a third-party plugin called Silver Efex Pro.



“...asking two strangers to interact at very close quarters can be a bit daunting, but once we were into it, they both worked well.”



f/6.3 1/160
ISO 100



You may notice that the camera settings didn't change throughout the shoot. It was the relative power output of the flashes that we used to alter the lighting levels. For this high-key shot, all lights were set at equal high power to provide even illumination. Another flash was fired at the backdrop at full power to really light up the grey paper and turn it to bright white.



We tried simple hands on hips posing, head tilts and leaning forward with hands on the tops of her thighs. We also had hat, glasses and a scarf for her to work with to give those hands something to do in the shot rather than appearing self conscious.

Another look

Once our solo shots were done, we took a break, which gave us the chance to review the shots so far. After lunch Jamie had some touch up work done to his makeup, then Courtney was back in the makeup chair for her second look which was going to be more glamorous than her first.

We took the opportunity to do some shots of Jamie, who was interested in doing some with no shirt on, similar to David Beckham. He had a number of impressive tattoos, so we went for a 3/4 view and simple folded arms poses, we also did some with a black shirt similar to some pictures we had seen of Johnny Depp. With Courtney ready and both having had a change of clothing, we started the session involving them both.

Two's company

Despite our two models being inexperienced, we also kept the two of them together in simple poses. We did a series of

shots, sitting and standing, where one was engaging the camera directly whilst the other was looking off into space. We also did a few where we needed their faces in close proximity. This is where inexperience would show. As you might imagine, asking two strangers to interact at very close quarters can be a bit daunting, but once we were into it, they both worked well. Our original lighting setup with the scrim as our large window-like illumination, served us well for the entire shoot, with some moving of light positions depending on whether our subjects were standing or sitting. We did try an extra light, at full power, aimed at the backdrop to expose it to white for some high-key shots too.

Last shots

Our models had one more change of clothing, and we did some more solo work with both of them, and we were done. We arrived at 9am and got set up and all our gear was packed away into our cars by 4.30pm. It had been a long day, but we got through the setups and there were a lot of shots to process, but plenty for Courtney and Jamie to choose from. If you are considering taking your portrait work to the next level from your simple home studio, getting into a studio environment with models is not as daunting as you might imagine. ■

Let there be lights

More illuminating tips on lighting

We covered setting up a basic home studio earlier in this issue. Now we want to expand upon some more of your lighting options and also light modifiers. Photography is all about controlling light, and for that you're going to need some sort of lighting system. The first decision is between continuous and flash lighting. Continuous lighting used to mean powerful 500W incandescent bulbs, which use a lot of electricity and generate a huge amount of heat, making them impractical for home use. However recently high output low energy fluorescent lamps have provided a more practical alternative, and there are several systems available based on this technology. They are great for close range still-life and product shots, but cheaper models lack the power output and versatility for serious portrait photography.

Sarah-Jane was photographed against a mid-grey collapsible background. Two flashes were used for this shot. Both flashes had white shoot-through brollies attached. The key light was placed to her left, above head height, and facing down. The second light was placed to her right and the power reduced to half the power of the key light to fill in any deep shadows.



Elinchrom and Bowens are two highly regarded manufacturers of monobloc lighting. Starter kits are reasonably well priced, but more powerful, and fully featured models, come at quite a premium.



The most popular choice for the home studio is flash lighting, and there are a number of manufacturers that sell starter kits designed for home use, starting at under £200, although it's worth spending extra to get decent quality. Brand names to look out for include Bowens, Elinchrom and Interfit. Although you can shoot portraits with just one flash head and a reflector, it's a better idea to start off with a two-head kit. A pair of 250Ws heads is adequate for home use, but a couple of 500Ws lamps gives you enough power to shoot in larger spaces. If you buy a third head you should also get a boom-arm stand, so you can use it as a hair light.



Speedlights are a cheaper alternative to monobloc lights. They have much less power, but they are light and portable. Great for a temporary studio where equipment needs to be regularly packed away.



Reflectors are cheap and a good means of redirecting light from your main flash back into the scene as a fill light.

These studio strobes are often referred to as monoblocs because they are self-contained, independently controlled units with their own power source, not dependent on a central power supply.

Flash systems offer a wide array of accessories, most with specialised uses, but you can start off with just the basics. Two medium reflectors with brolly mounts, two brolly reflectors or one brolly and a 1m softbox, and either a snoot or honeycomb for more directional lighting, should be enough to get you started. You can always add more gadgets later. Barn doors are also useful for blocking out unwanted light.

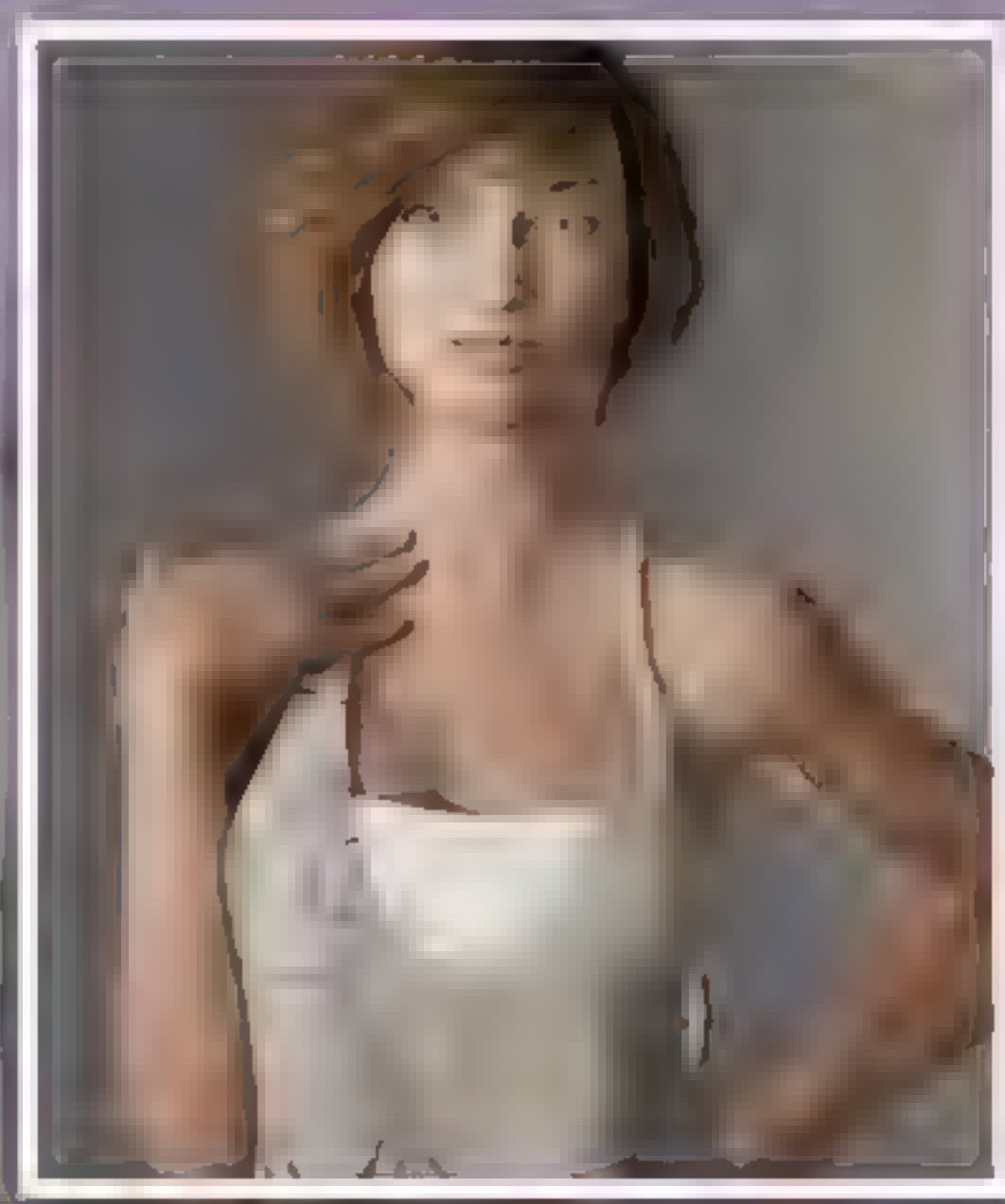
As well as the lighting system a couple of reflectors are always useful. The best brand name for these is Lastolite, which makes a range of collapsible reflectors in different sizes, shapes and colours. Start off with a 1m silver gold round reflector and see how you get on with it.

You don't need to start your home studio with big monoblocs. If you have a speedlight or two in your kit bag, then you have the basis of a good, portable setup that is great for smaller studios, or even just temporary setups that are in cramped conditions. All the basic light modifiers you can get for a studio strobe are available in some form for a humble flashgun too. With a couple of long sync cords, or a cheap wireless trigger system, along with a couple of shoot-through brollies, you have the core of a great little studio.

Now that you have your space and your lights, it's time to get shooting. If you are going to be doing portraits, there are a few key lighting setups that are good to know. We have a few diagrams next that show the basic arrangement of lights and reflectors to get your shots looking their best. ■

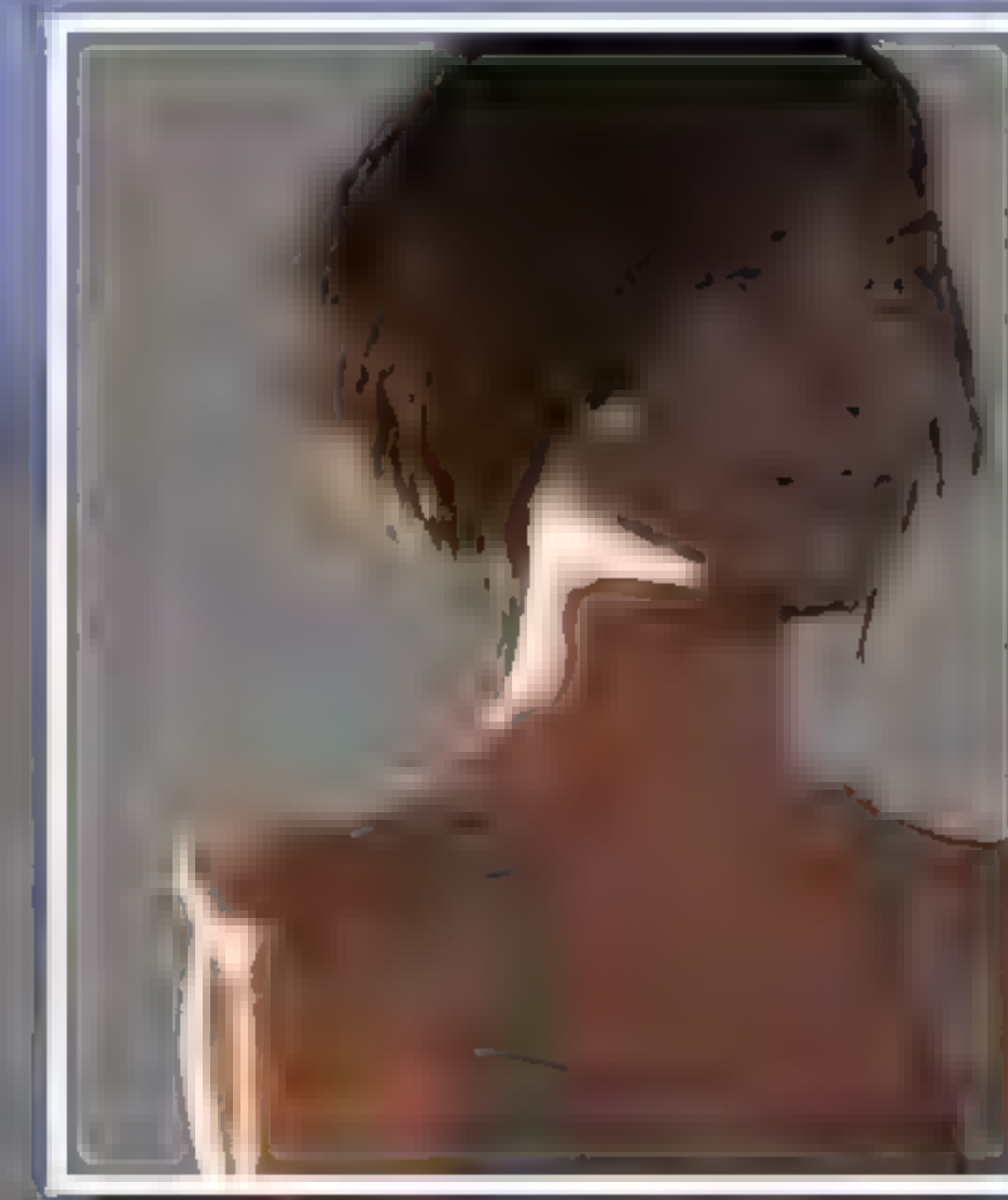


Brollies (above) and softboxes (left) are two main light modifiers worth investing in, to elevate your creative lighting capabilities in the home studio environment.



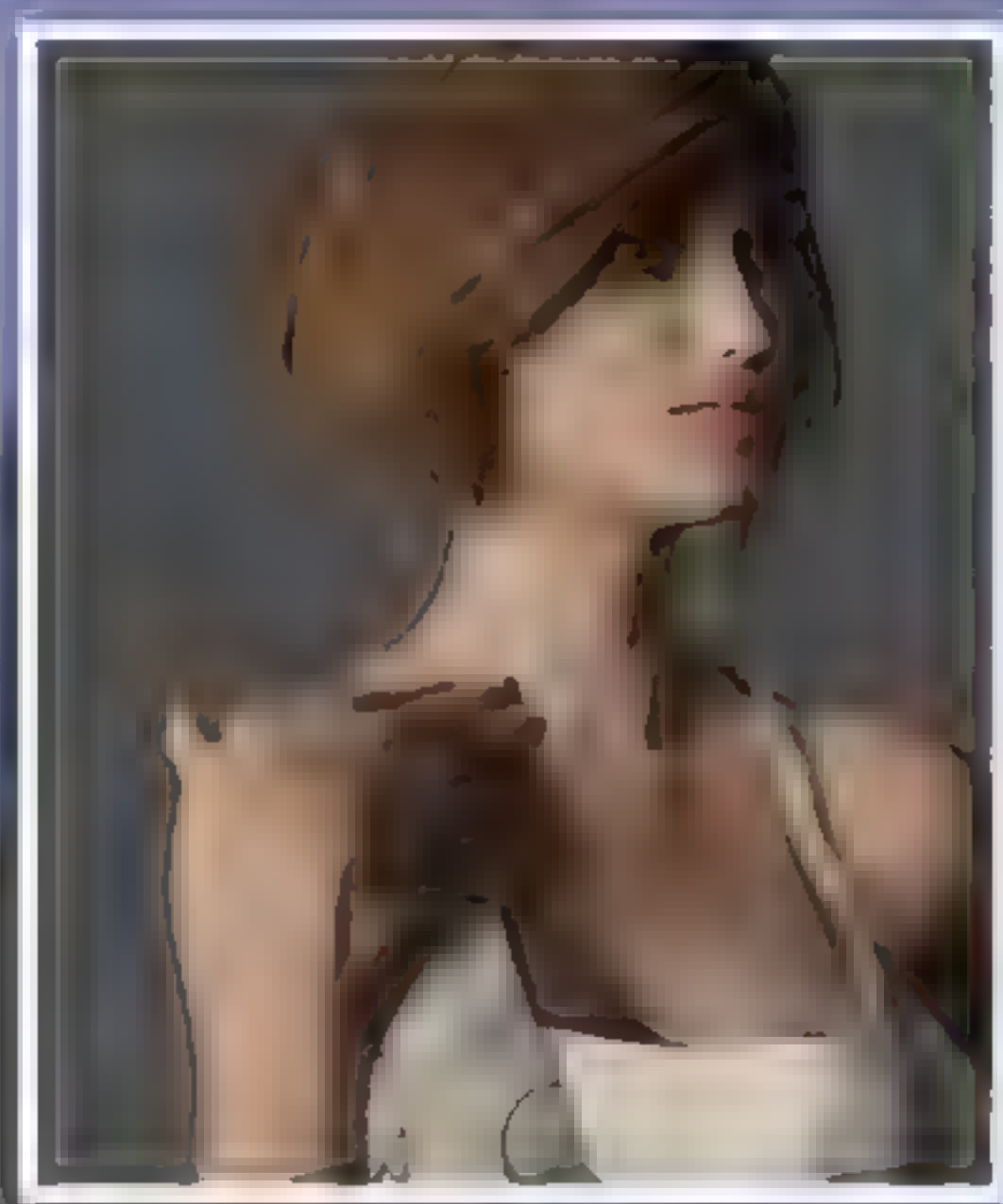
1. Three-point lighting

This versatile type of lighting is used widely in most visual media. The three lights are usually positioned equidistant around the subject and by altering the relative brightness of each light, you can decide from what angle your subject is lit. You can backlight them by having the light at the rear as the main key light. You can make one on either side the key light and the others just fill lights, and so on.



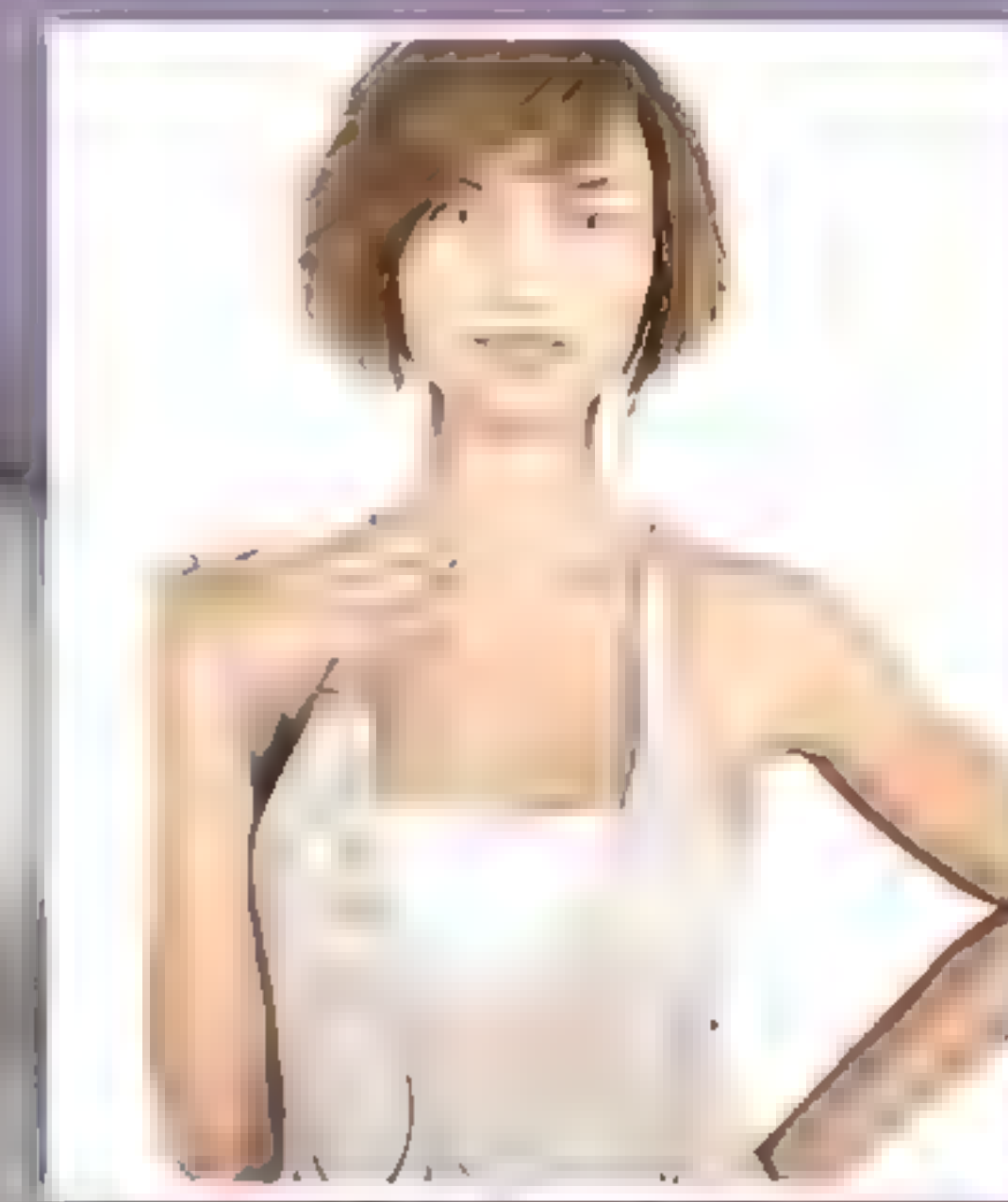
2. Backlighting

As the name suggests, the light is placed behind your subject. The effect is a bright rim light that envelops the subject, either in part or whole. The subject can be reduced to a silhouette, or if required, a reflector can be used to bounce light back onto the subject for fill. If the light is placed slightly off to one side, you have what is referred to as a kicker light, which creates a bright highlight on one side of the subject. It is used to create some separation of the subject from the background.



3. Broad lighting

Broad lighting refers to how a subject's face and body is lit. The subject does not face the camera, they are angled off to one side. The wider side of the face/body that is largest and closest to the camera is the side that is illuminated. The narrower part of the face that is furthest from the camera is in shadow. Broad lighting is generally held to be useful for making a slim face appear wider and reducing the appearance of wrinkles.



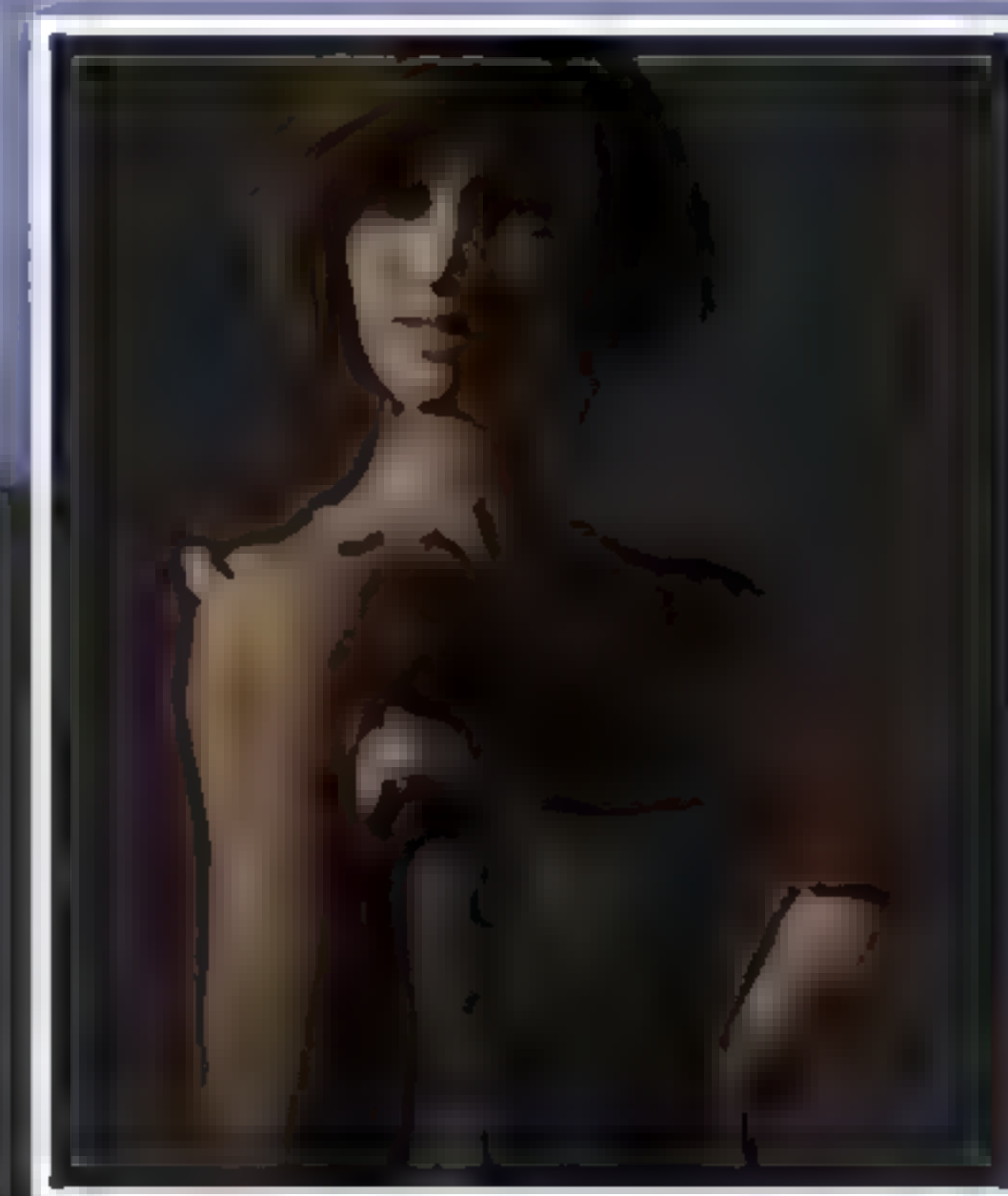
4. High-key lighting

High-key lighting, in its basic form, can be seen as a derivative of the main three-point lighting setup. High-key requires that the lights are at a higher power than is usual, in order to banish as many shadow areas as possible. Some photographers will light their subjects to extreme degrees in order to completely overexpose them. High-key is regarded as an upbeat, light-hearted form of lighting.



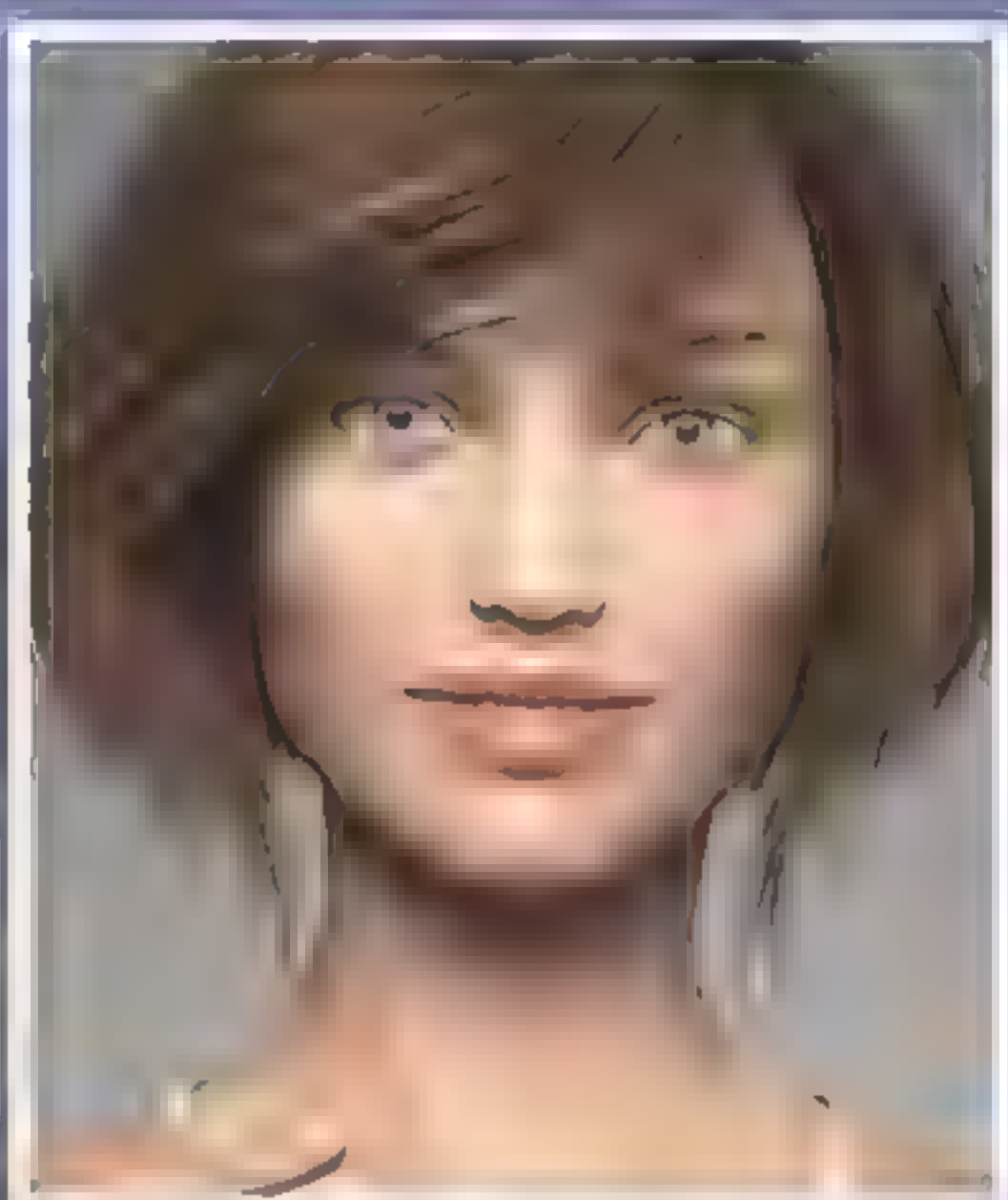
5. Loop lighting

The light is usually placed above your subject's eye-level, roughly 45° from the camera. Loop lighting refers to the small pool of shadow that is cast from the subject's nose on their cheek. Generally, you need to keep the light at a high enough angle that it creates a shadow that falls slightly downwards but does not touch the cheek area. This method of lighting is very popular, easy to set up, and is flattering for most facial types.



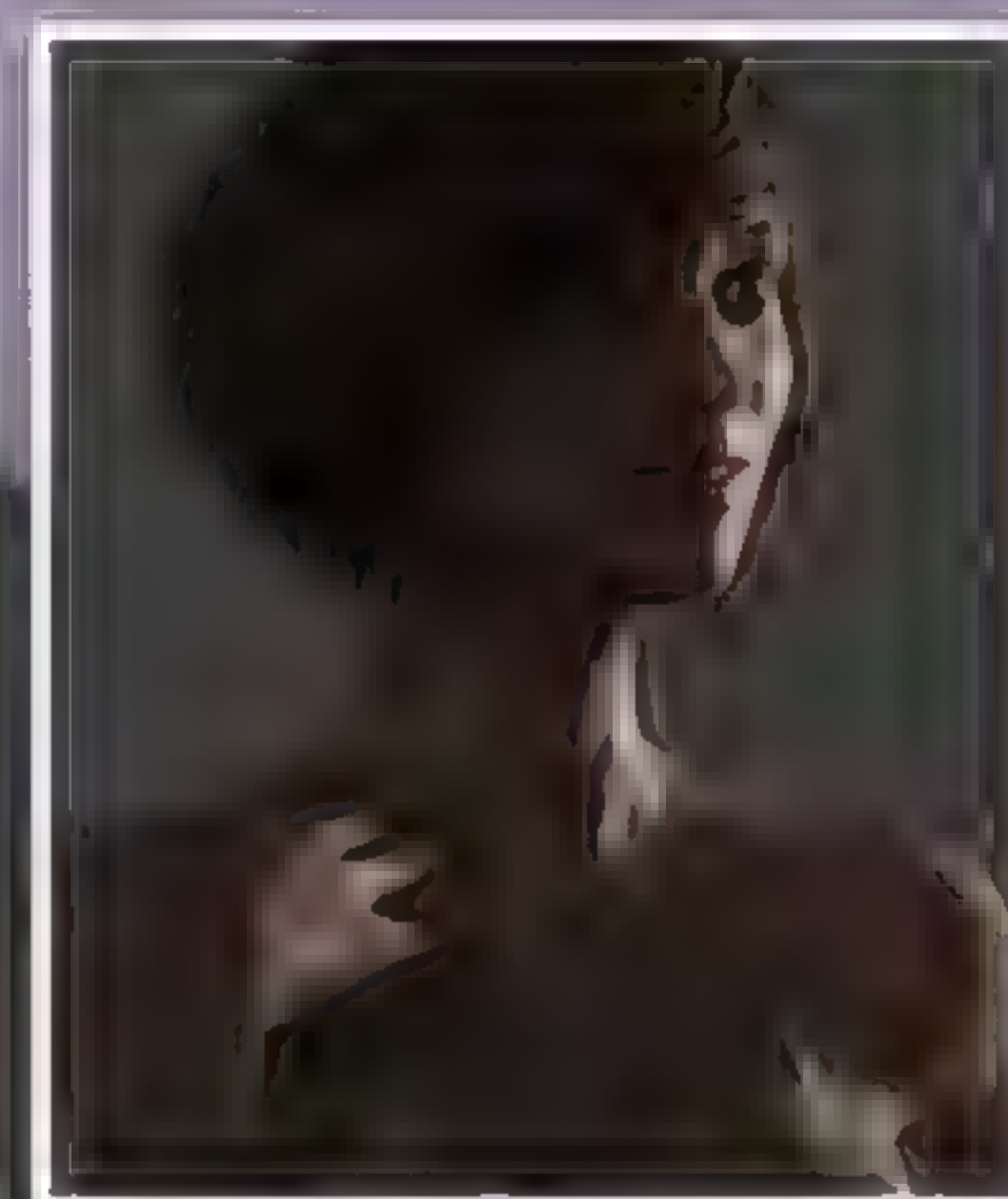
6. Low-key lighting

Low-key has been used extensively in all visual media. It creates what is known as the Chiaroscuro effect. This is the use of strong contrasts between light and shadow that helps define the three-dimensional shape of a subject to give it a sense of volume. Often used with only one light, it is a dark, moody, kind of lighting that can add drama to an image. Additional fill lights or reflectors can be added to control the contrast if required.



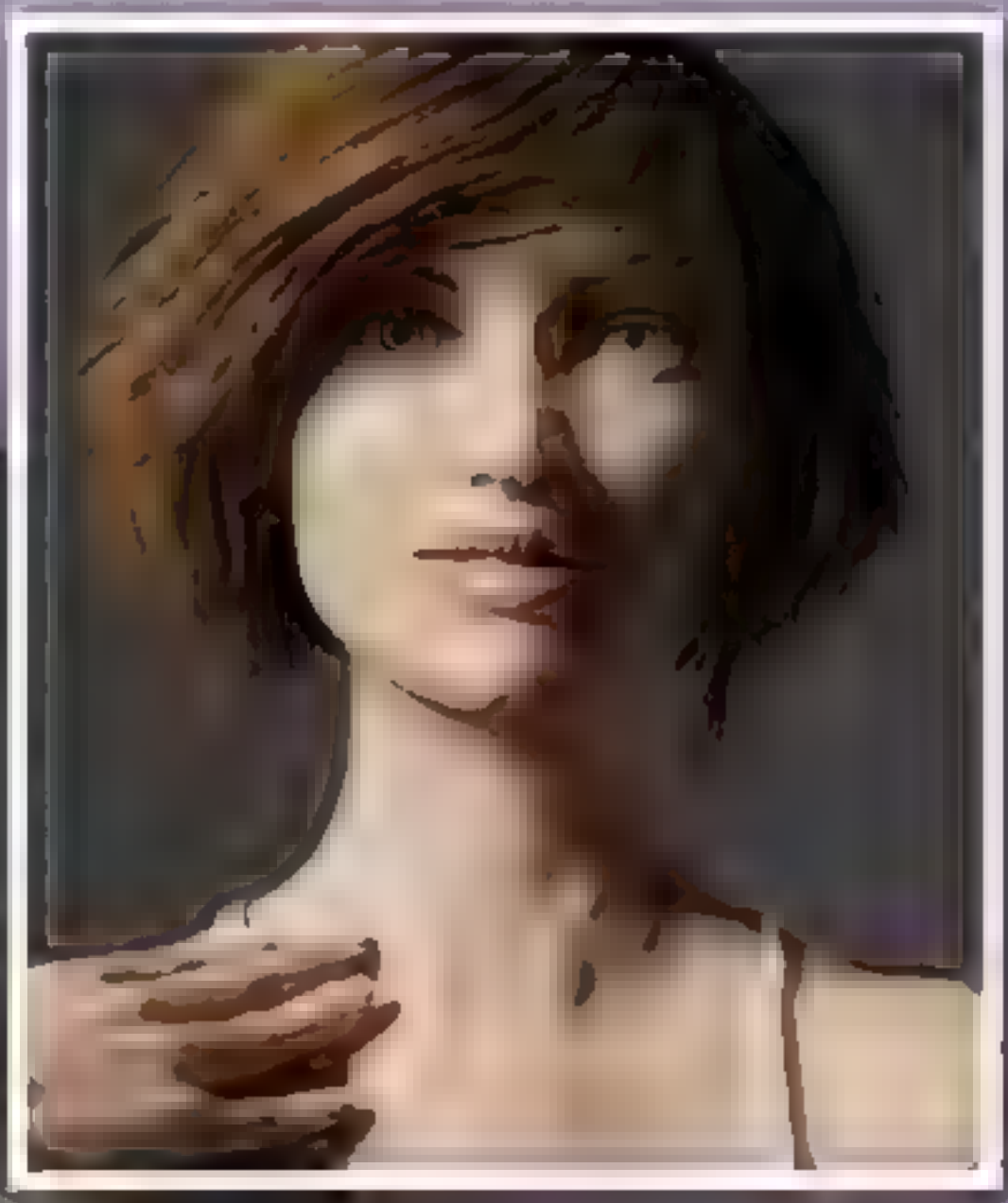
7. Paramount lighting

Sometimes referred to as butterfly lighting, this lighting style used to be the signature setup created by the Paramount film studio with which to photograph its leading ladies at the time. The key light faces directly at the subject, and is elevated high above eye-level and angled down on to their face. This method casts a small shadow under the subject's nose in the rough shape of a butterfly. It is a good style to even out skin tone and accentuate cheekbones. It is generally regarded as a more feminine lighting method.



8. Short lighting

Short lighting is the opposite of broad lighting. Once again, the subject is facing away from the camera at an angle. Now, the widest, broadest part of the subject's face/body is in shadow. The narrowest part that faces away from the camera receives the illumination. More of the face is now in shadow. It's a good style to use for its slimming qualities and adds a more three-dimensional, sculpted feel to the shot.



9. Rembrandt lighting

This is a style of lighting named after the Dutch painter Rembrandt, and is a very natural style, using minimum equipment. The key light is normally placed well above head height and off to one side of the subject. A second fill light or reflector is placed on the unlit side of the subject to keep shadows from becoming too dark and losing detail. Rembrandt lighting is characterised by the triangle of light appearing under the eye on the unlit side of the face.



10. Kicker lighting

Kicker lighting is a form of three-point lighting. The main key light is set in front of the subject on one side. The two kicker lights are normally placed behind the subject on either side at roughly 45°. These two lights are often set to overexpose the subject by about 1 stop of brightness, to create a bright outline around the subject that helps to lift them from their background. It is particularly useful if the subject needs to be cut out of the current background, and composited into a new one.





The image of Oli (left) was created with a three-point light setup. A key light was placed camera right, and another key light, at higher power compared to the main light, was placed camera left and another light was directed at the backdrop with enough power to create a pool of light behind him.

Baby Isabelle (above) was shot with a similar setup, except this time the power of all the lights were increased to create a high key image. The main lights used large softboxes in order to help create softer shadows.



You will no doubt find, as you continue to experiment and gain confidence with various lighting styles, that there is a great deal of overlap between the various types of lighting. The basic types we have shown you here are just the tip of the lighting iceberg. They can be adapted and combined as you wish to create the look you need for your shots.

If you are new to the world of lighting, it is a very good idea to seek out a local camera club, as they will often have equipment and access to studio space where you can experience what it is like to be in complete control of light. ■

Glossary

A list of some general photographic terms

Aperture

Behind the lens of your camera is a movable circular iris which opens and closes to control the amount of light falling on the sensor. This is usually controlled by the camera's light meter, although some cameras have a manual aperture control. Altering the aperture also changes the depth of field.

Aperture priority

This is one of the semi-manual exposure options found on some cameras. The user sets the aperture according to the depth of field they require, and the metering system sets the shutter speed to obtain the correct exposure.

Artefacts

When an image is stored in your camera's memory it has to be compressed to fit, usually into a JPEG file, and in the process some information is inevitably lost. When the image is uncompressed for viewing, noise creeps in and appears as angular blocks in the image, which are known as artefacts.

Autofocus

Almost all digital cameras have automatic focusing. There are essentially two types; contrast detection, used in compact cameras and most CSCs, uses the camera's main sensor and works by detecting the borders between high-contrast areas and trying to make them as sharp as possible. Phase detection AF is used in digital SLRs and some CSCs, and uses a separate sensor. It is usually faster and works better in low light.

AE lock

Stands for Auto-Exposure Lock, a function found on most advanced digital cameras. This enables you to take a light meter reading from a particular part of the image and then hold that setting while you compose the image.

Back lighting

Backlighting occurs when your subject is brightly lit from behind, such as somebody standing in front of a sunlit window. Unless you adjust the exposure to compensate for this, your subject will appear as a dark silhouette against the bright background.

Barrel distortion

Barrel distortion occurs when a lens, usually wide-angle, distorts an image so that it appears slightly spherical. If you take a seascape with a wide-angle setting and notice that the horizon seems to curve, this is barrel distortion. It's most noticeable when there are straight lines near the edge of the frame. In digital images barrel distortion can be corrected in image-editing software.

Bokeh

The visual quality of the out-of-focus areas of a photographic image, especially as rendered by a particular lens.

Bracketing

Bracketing shots is where a photographer takes the same shot three times or more, each at different exposures. This increases the chance of getting an ideally exposed image. Also, it's possible to combine the shots in software to increase the light and shade within the image, which is how HDR works.

Burst mode

Many cameras offer a burst mode, which means they can take several images in rapid succession, just as you'd get with a motor-wind on a traditional film camera. The number of shots that can be taken is limited by the speed of the camera's image capture and processing systems, as well

as the size of the internal memory buffer. You'll typically get about three frames per second from a standard digital camera in burst mode.

Centre-weighted metering

This is when the camera takes an average light reading from the whole frame, but pays more attention to the centre of the image where the subject normally is. This has been largely superseded by multi-pattern metering, which is better able to cope with unusual situations.

CCD

Stands for Charge Coupled Device. This is the light sensor behind the lens of your camera that records the image when you take a photograph. It consists of a grid of millions of tiny light sensors, one for each pixel of the image. The size of a CCD is measured in megapixels, and the higher the megapixel rating, the better the image quality.

Chromatic aberration

Coloured fringes that appear around objects, often toward the edges of the frame. Caused by light rays of different wavelengths coming to focus at different distances from the lens.

Circular Polariser

A filter that is placed in front of the camera lens in order to darken blue skies, manage reflections, or suppress glare.

CMOS

Stands for Complimentary Metal-Oxide Semiconductor. A chip-manufacturing technology used to produce the sensors in an increasingly large proportion of digital cameras. Cheaper but with better tolerance than other methods.

Depth of field

When you focus your camera on a subject, some detail behind and in front of the chosen subject will also be in focus. The distance between the nearest and furthest in-focus objects is known as the depth of field. It is changed by altering the size of the aperture; the smaller the aperture, the larger the depth of field.

Digital zoom

Some cameras give you the option of zooming in on the centre part of an image by expanding it in the camera. Although the zoomed area looks bigger, it still contains the same number of pixels as it did originally, so it will appear blocky and will lack resolution. Not to be confused with optical zoom, which is far superior.

Dynamic range

The difference between the lightest and darkest areas of an image. If a camera can simultaneously capture shadow and highlight detail then it has good dynamic range. Few cameras can do both.

DPI

Stands for Dots Per Inch. The sharpness of an image produced by a printer is defined by how many dots of ink per inch of printed paper its print head can produce. A figure of 1,200dpi or higher is usually required for photographic-quality results, although most modern printers are capable of this.

Effective pixels

Although your digital camera may claim to have 13.6 million pixels on its CCD, some of that number will not be used for taking the picture. Usually, some pixels around the edge of the sensor are painted black to provide a colour balance, while others fall outside the range of the lens.

Electronic viewfinder

Some cameras have a viewfinder containing a miniature LCD monitor showing you what the camera sees. This usually uses less battery power than the LCD screen on the back of the camera, but can be a strain on the eye and difficult to focus.

Exposure

When you take a picture, the light meter in the camera determines how long the shutter should be open for and how wide the aperture should be, thus obtaining the correct exposure. If a picture is too dark, it is underexposed, whereas if it goes the other way and is too light, it is overexposed.

External flash

This means that the camera has a connection, usually a hot shoe, that enables you to use a flashgun other than the one built into the camera. This allows a lot more creative freedom and control over lighting, because the flash can be positioned further away from the camera. This feature is only usually available on more expensive or professional-quality cameras.

EXIF

The Exchangeable Image File (EXIF) format is used by nearly all digital cameras that output pictures as JPEGs. It enables information, such as the GPS co-ordinates, date and time the shot was taken, plus exposure and other camera information, to be stored in the image file alongside the normal picture information.

Fixed focus

Cheaper cameras have fixed-focus lenses, which means they cannot be adjusted. Instead they rely on a very narrow aperture to make everything appear in focus, from a few feet in front of the camera out to infinity. They are fine for snapshots at average distance in good light, but are not so good for creative photographs where focus can be used to produce unusual effects.

Focal length

In brief, this term describes the magnifying power of the camera's lens. The longer the focal length, the greater the magnification. Conversely, the smaller the focal length, the more wide-angle the lens. Most digital camera zoom lenses can vary between short and long focal lengths.

f-number

This is the number which describes the ratio of the aperture of a camera's lens to its focal length. Generally, a higher quality lens will have a smaller f-number, which bizarrely means a wider maximum aperture, and thus more light entering the lens. See also 'Depth of field' for more information about focusing.

Forced perspective

This is a technique which employs optical illusion to make an object appear farther away, closer, larger or smaller than it actually is.

HDR

A rather over-used technique whereby several shots at different exposures are combined to produce one image capturing a very wide range of contrast, or dynamic range. Useful for high-contrast lighting and night-time shots, but can be over-used by art students who've just discovered it.

Histogram

A histogram is a graph of brightness. It ranges from black through grey to white along the horizontal axis, while values in the vertical axis represent the number of pixels at the appropriate brightness. It

provides a means of checking the exposure of an image. If too many pixels are present at the left-hand side of the histogram, the image is underexposed, while if it's weighted to the right, then it's likely to be overexposed.

Hyperfocal Distance

This is the distance between a camera lens and the closest object which is in focus when the lens is focused at infinity.

Infrared

Infrared (IR) light is the part of the EM spectrum that people encounter most in everyday life. It is invisible to human eyes, but people can feel it as heat.

Interpolation

Some cameras and image-editing software can increase the size of a digital image by adding extra pixels in between the original ones. They take an average of the pixels around the new one and attempt to match the colour and brightness to create a seamless image. Some systems give better results than others.

ISO

Stands for International Standards Organisation. In conventional photography, the ISO number is a measure of the light sensitivity of photographic film, and this has been carried over into digital photography as a way of expressing the light sensitivity of the CCD.

JPEG

This file type stands for Joint Photographic Expert Group, and is the most commonly used system of image compression. Using a sliding scale between file size and picture quality, it enables digital cameras and computers to squash a large picture into a small amount of memory. Be careful when compressing files, though, because too much compression will reduce the quality of your image.

Landscape mode

A program exposure option found on many mid-priced cameras, this function automatically selects the best exposure settings for taking landscape photographs, usually a longer shutter speed and the narrowest possible aperture to maximise depth of field. It can also refer to holding the camera horizontally, which is usually preferred for landscape shots.

LCD

Stands for Liquid Crystal Diode, a display technology first developed in the 1970s, and in widespread use today. Most cameras have an LCD monitor screen mounted on the back for viewing photographs. Some also have an LCD electronic viewfinder, and some DSLRs also have a separate LCD data display panel.

L-ion

Stands for Lithium Ion. This is the latest kind of rechargeable battery, superior even to Ni-MH. It can hold more power, and does not suffer from 'memory effect', where a partially charged battery, when recharged, will only register the additional charge rather than its full capacity. However, L-Ion batteries are quite expensive.

Macro mode

Refers to a lens that can focus closer than its designated focal length, but these days it is used to describe any facility for taking extreme close-ups.

Manual mode

Found on higher-end cameras, this is for experienced photographers only. It gives you full control over both aperture and shutter speed, enabling you to experiment

with exposure and depth of field. Essential for creative photography.

Megapixel

Megapixels are a measure of the size and resolution of the pictures that a digital camera can produce. Mega means one million, and in this case a million pixels, or more accurately a million individual light sensors on the camera's CCD. The more megapixels, the better.

Memory card

Most digital cameras store your pictures on removable cards full of computer memory. They come in a variety of sizes and there are several different types, including CompactFlash, SD and MicroSD cards as well as Sony's own MemoryStick format.

Metering system

This is how the camera measures the amount of light being reflected by whatever you are trying to photograph, to determine the correct exposure for that particular scene. There are many different types, including spot metering, multi-pattern metering and centre-weighted metering.

Monobloc

A monobloc is a self-contained flash unit usually found in a photographic studio.

Multi-pattern metering

This is a sophisticated means of determining the correct exposure of a photograph. The camera takes light readings from several different areas of the frame and compares them to its pre-programmed data.

Night-time mode

A program exposure mode that compensates for low light by setting the aperture to maximum. This lets the most available light into the camera and gives the fastest possible shutter speed under the circumstances.

Optical zoom

With recent advances in lens manufacturing technology, many digital cameras now have small but powerful optical zoom lenses. This means they can be adjusted to magnify the image (zoom in) or to capture a wide-angle shot (zoom out). Because the image uses the full capabilities of the CCD this is preferable to digital zoom.

Pixel

Short for Picture Element. If you enlarge a picture on your computer, you will see that it is made up of tiny squares of a particular colour and brightness called pixels. A pixel is the basic building block of a digital photograph, and there can be several million of them in an image. The higher the pixel count, the better the quality of the photograph.

Portrait mode

This is a program exposure mode that optimises the camera for taking classical portrait shots, widening the aperture to minimise the depth of field. This ensures that only the subject is in focus, while the shutter speed is increased to minimise camera shake.

Processor

All digital cameras have an image processor, which takes the data from the sensor and turns it into the finished JPEG image that you see on the screen. A faster processor means larger resolution images can be processed more quickly, improving the camera's performance.

Program exposure

Found on most digital cameras, program exposure is an automatic setting where the camera's metering system

selects an appropriate aperture setting and shutter speed in an attempt to get the best exposure and performance out of the lens.

Raw

Raw mode is found on most high-end digital cameras. It is an option which stores the uncompressed raw data from the sensor, which can then be processed on a computer using software such as Adobe Camera Raw, Bibble etc. Raw files contain more information than JPEGs, and take up more memory. Raw is actually not an acronym and so shouldn't be all capitals; it should really be written simply as "raw".

Resolution

The more pixels there are in an image, the larger that image will be. This is the resolution of the picture, and is usually expressed as two numbers representing the height and width of the image in pixels, such as 3,872 x 2,592. Multiplying these two figures gives you the effective megapixels, in this case 10.03MP.

Shutter

The shutter is a device behind the lens of the camera which is normally closed, but opens for an instant when a picture is taken to allow light into the camera and onto the CCD. The length of time the shutter is open for is determined by the metering system, and is known as the shutter speed.

Shutter priority

This is a semi-manual mode that enables the photographer to specify a shutter speed while the camera's metering system sets the aperture for the correct exposure.

SLR

Stands for Single-Lens Reflex. A mirror or prism reflects the light coming in through the lens to the viewfinder, so when you look through it you see exactly what the camera can see.

Spot metering

Found on the more expensive cameras, this metering mode enables the photographer to take a light reading from a small area in the middle of the frame, usually marked in the viewfinder. This is the best way of dealing with difficult lighting conditions such as backlighting, and is normally used in conjunction with auto-exposure lock.

Time lapse

We've all seen films of flowers opening at incredible speed, or the sun and clouds racing across the sky. This super-fast motion technique is called time-lapse photography, whereby a stationary camera takes several successive shots at time intervals of a few seconds, minutes or even hours. The images are then played back rapidly, giving the impression of continuous motion.

VGA

Stands for Video Graphics Array, and refers to an image size of 640 x 480 pixels. This was once the standard size of a computer monitor output, but these days even mobile phones have larger displays. VGA is still sometimes found as an image size mode, particularly in the video recording modes of some cheaper cameras.

White balance

Most modern digital cameras automatically adjust the colour balance of the picture to compensate for any tints in the ambient light, such as sunlight, fluorescent strip lights or normal light bulbs. This is called a white balance, and means you can take a picture indoors without that orange tint you get with a film camera.



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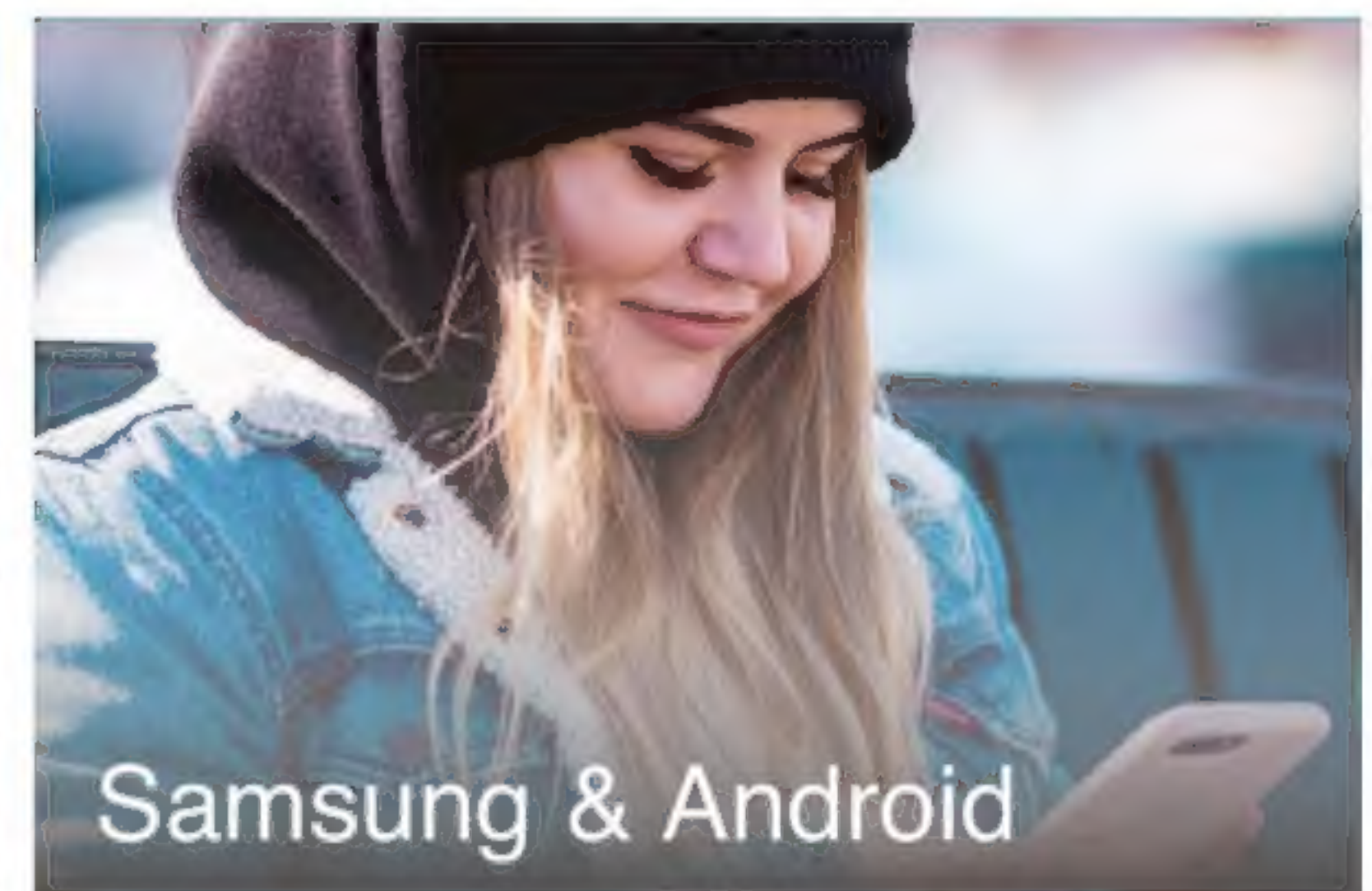
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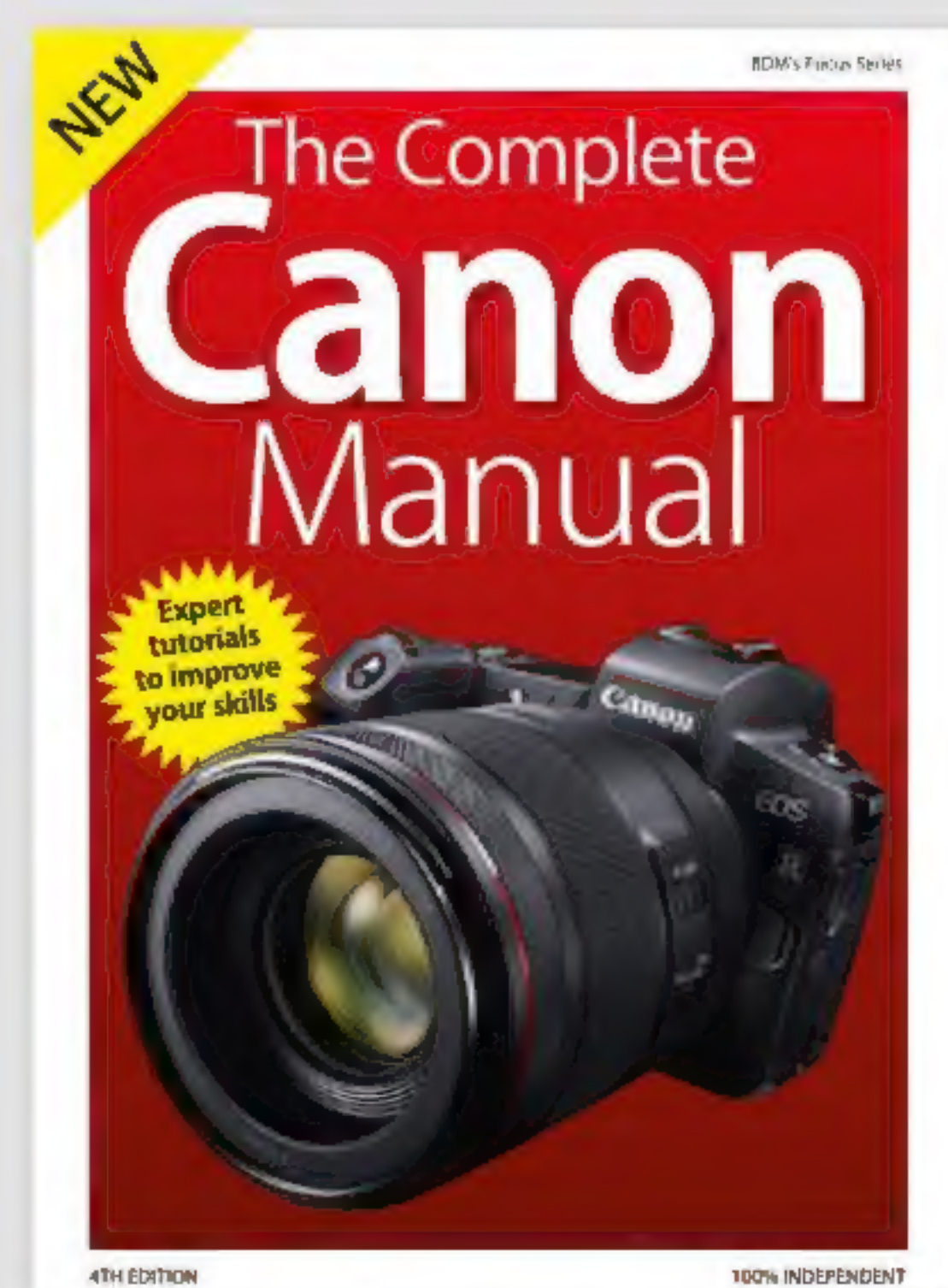
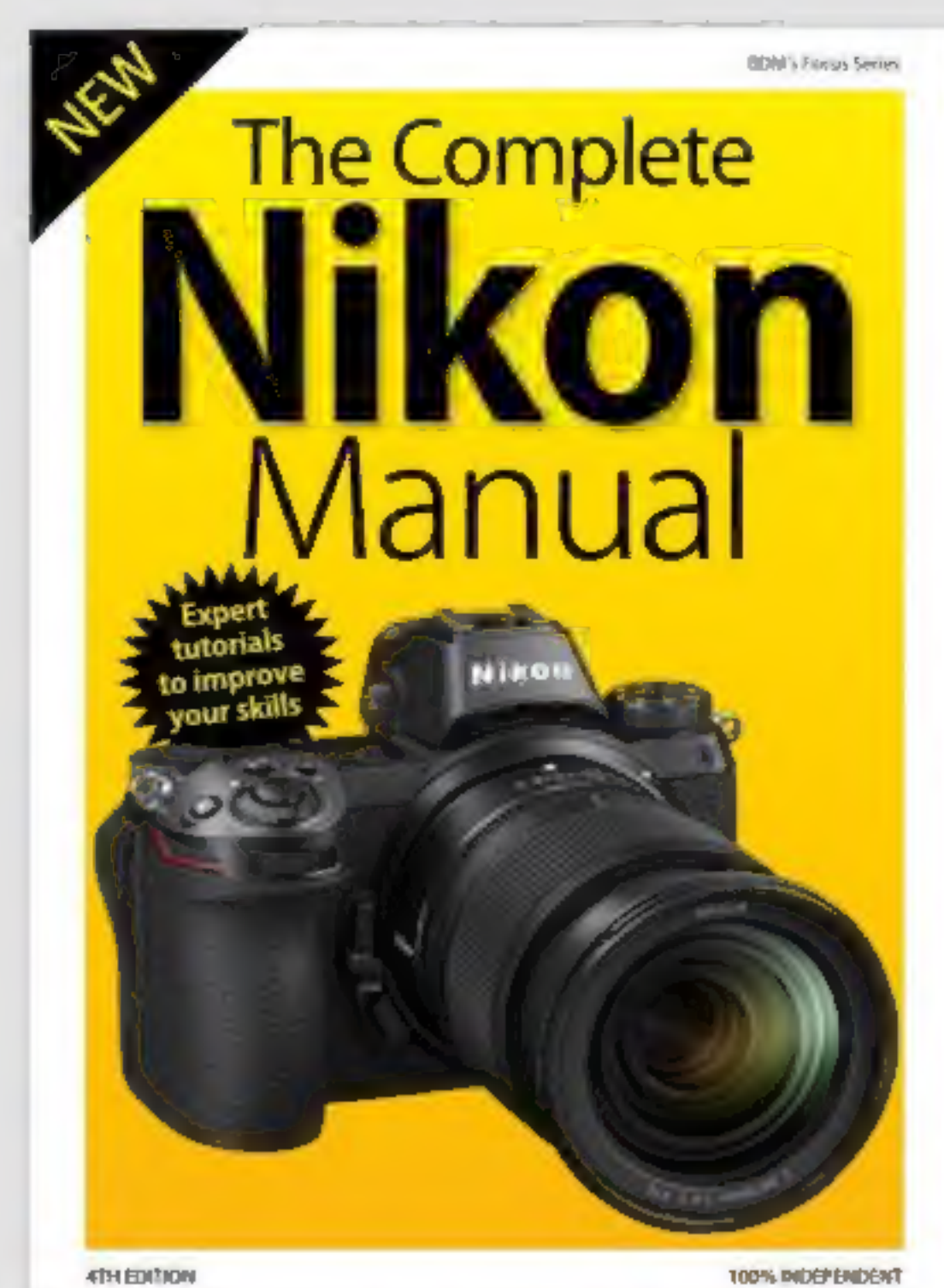
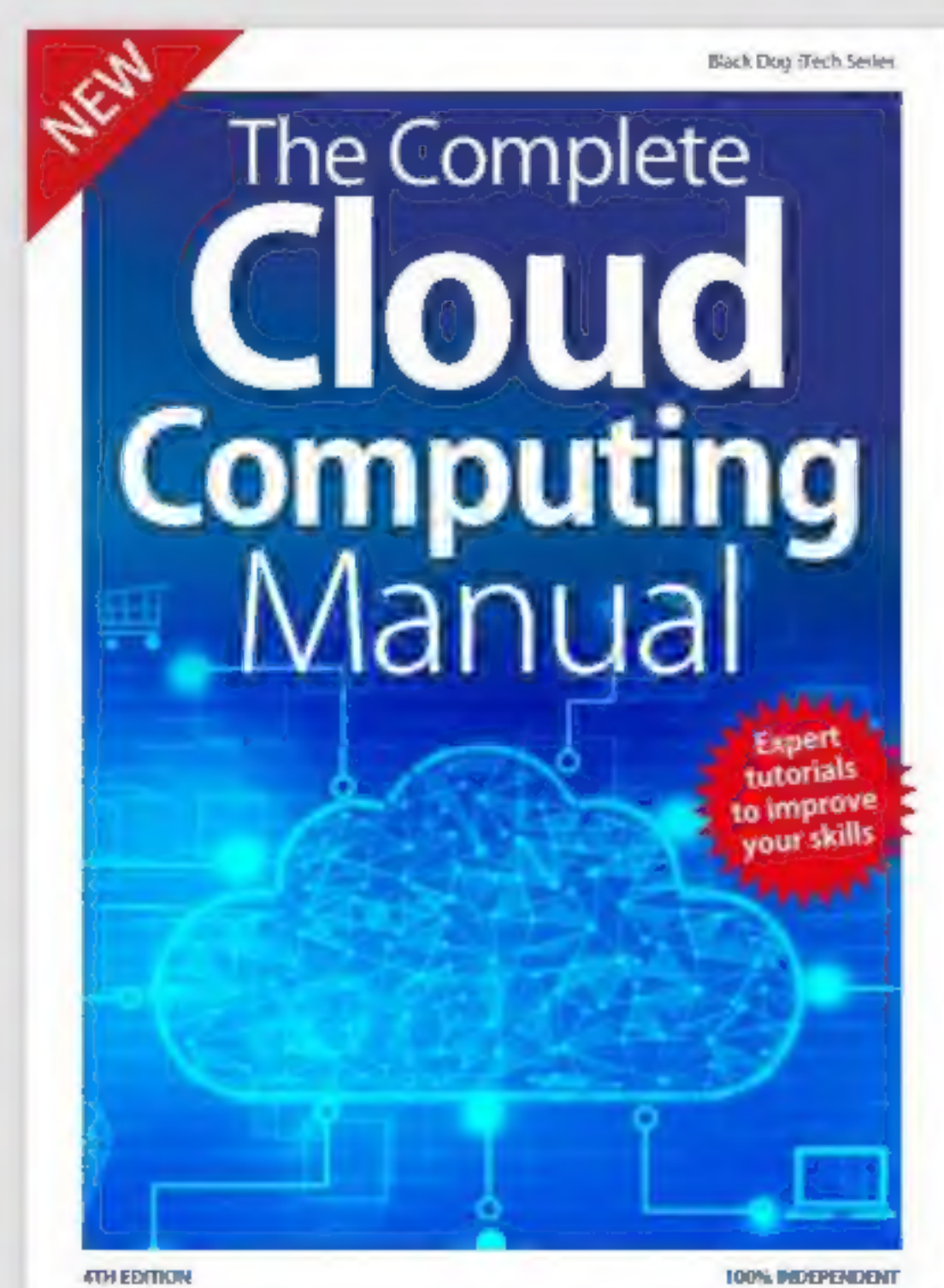
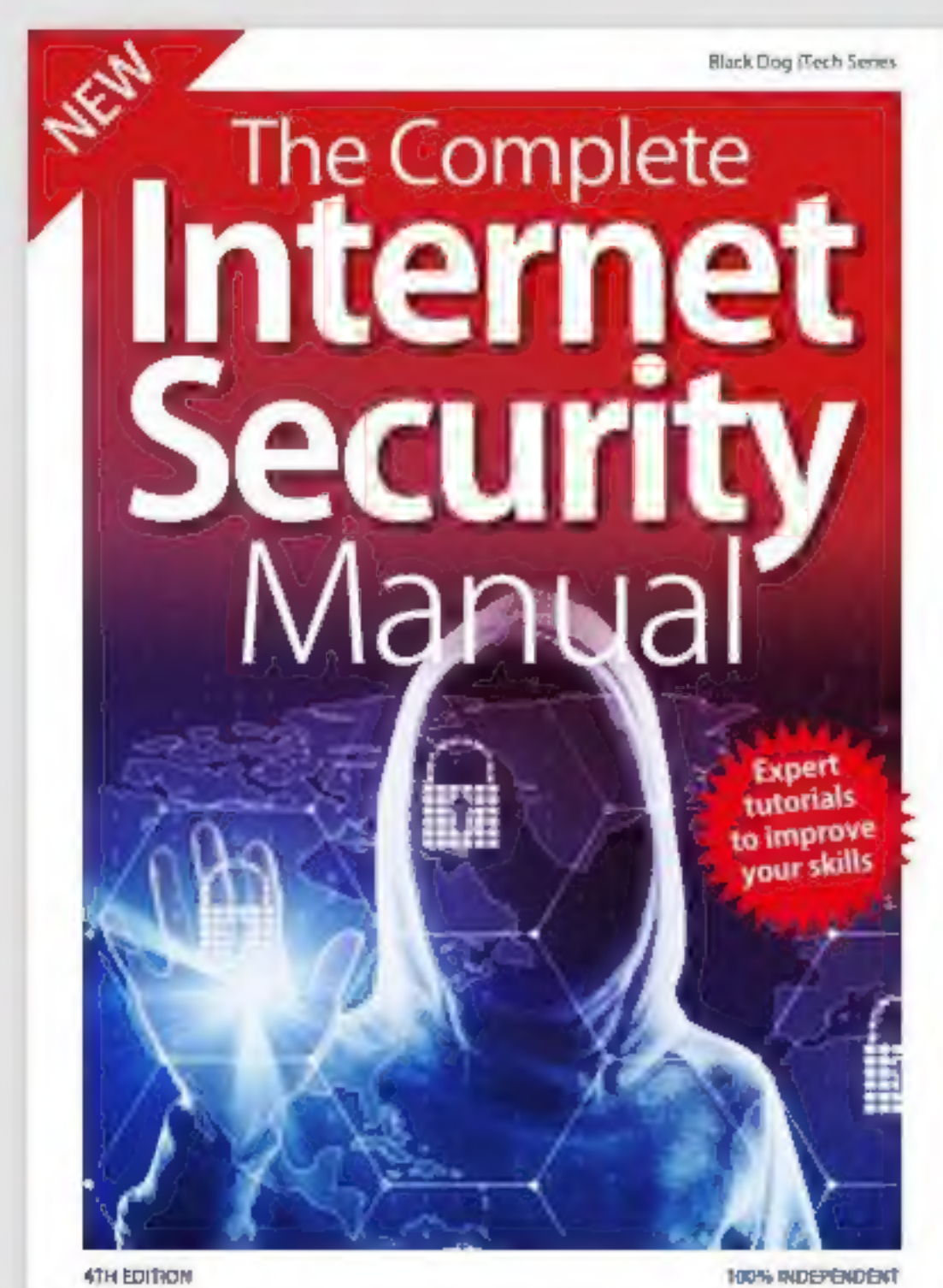
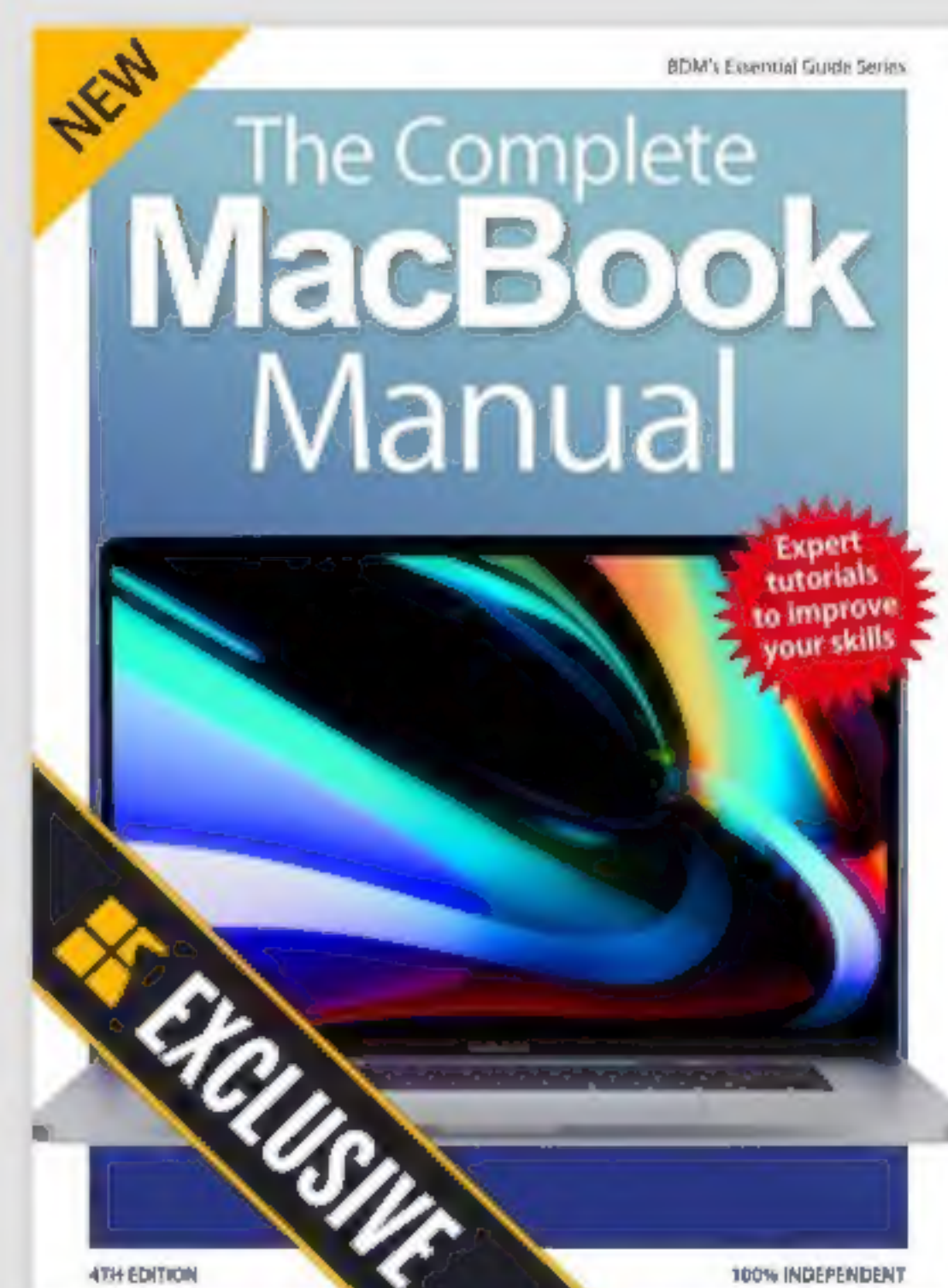
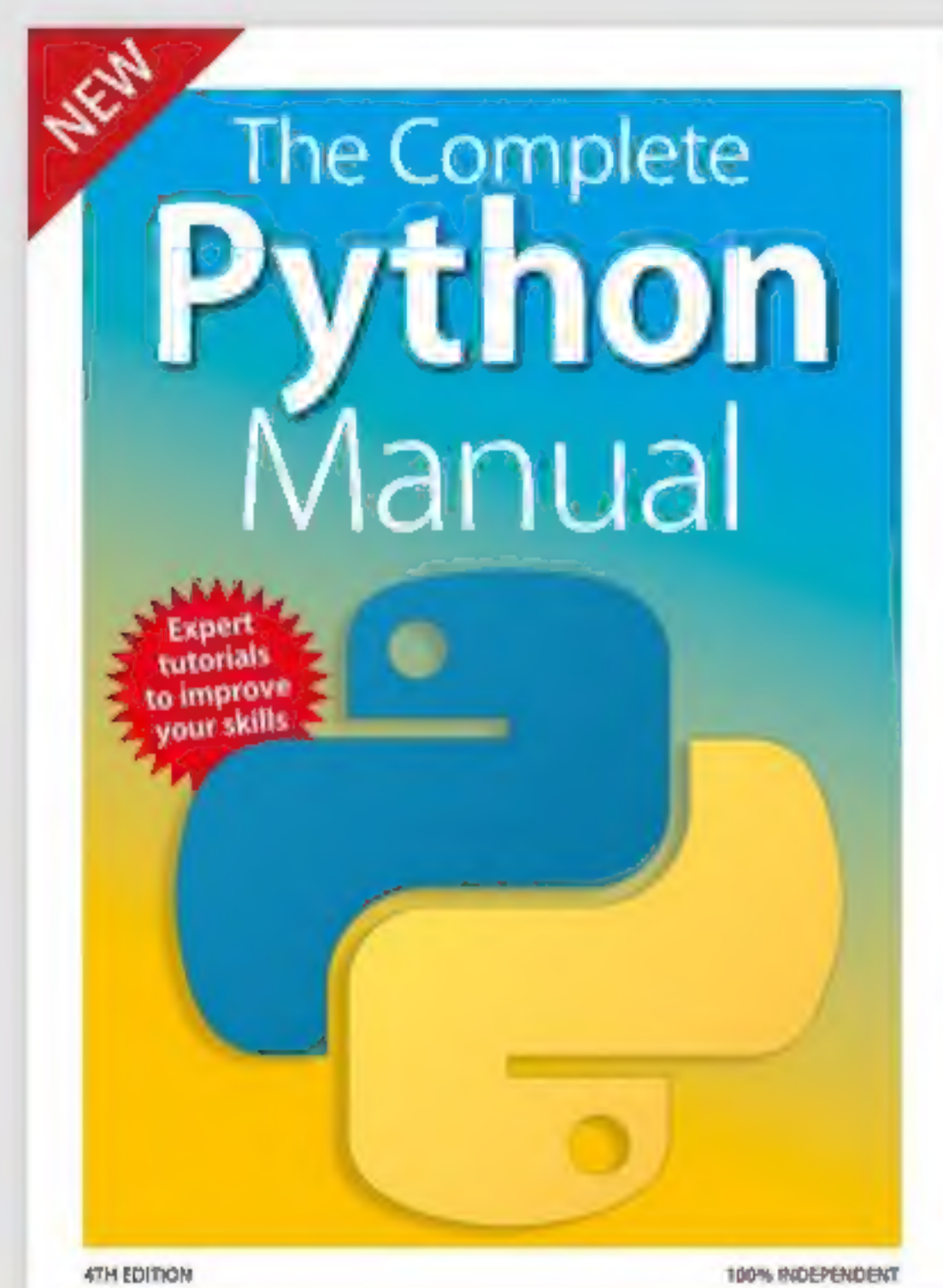
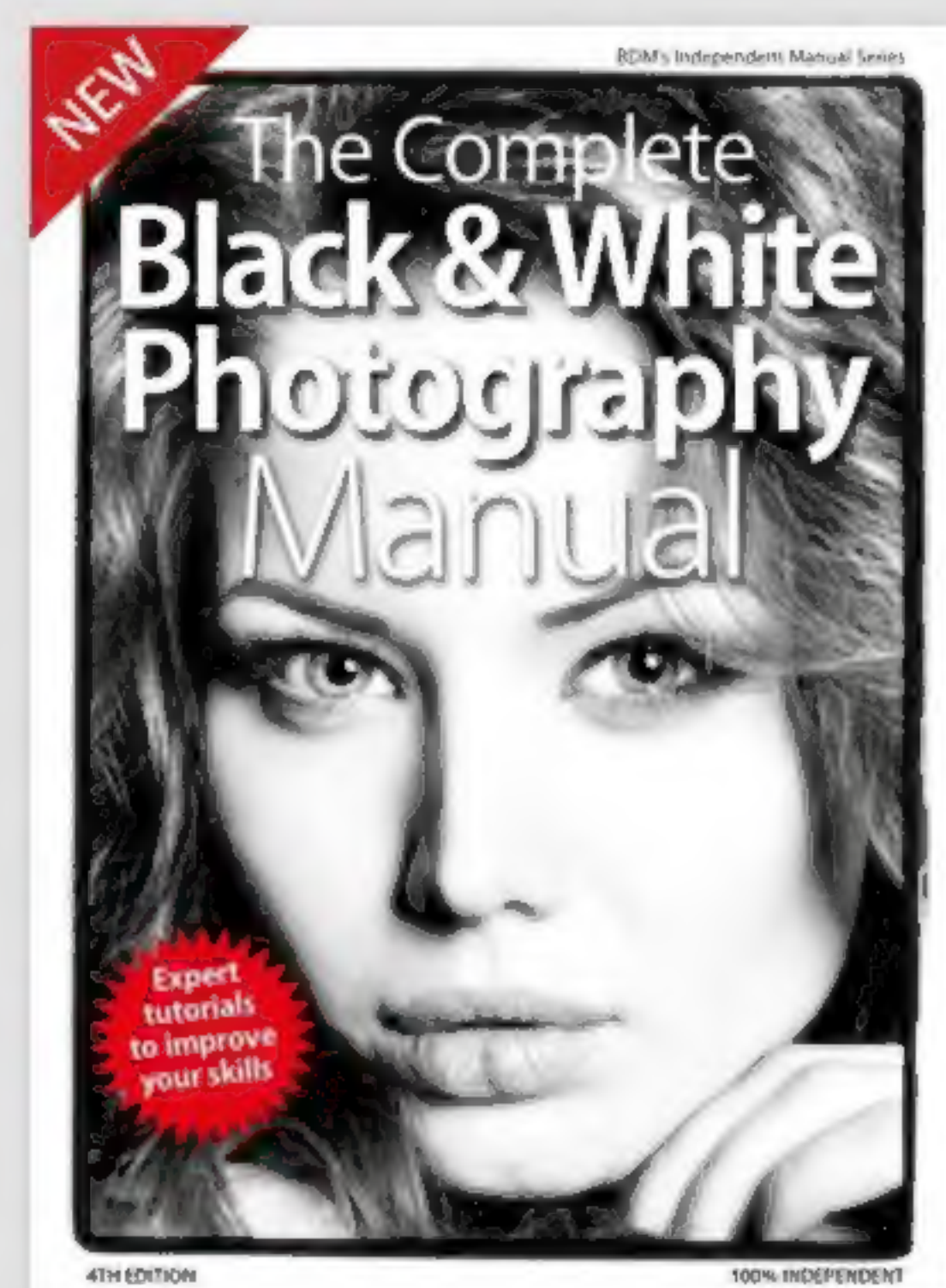
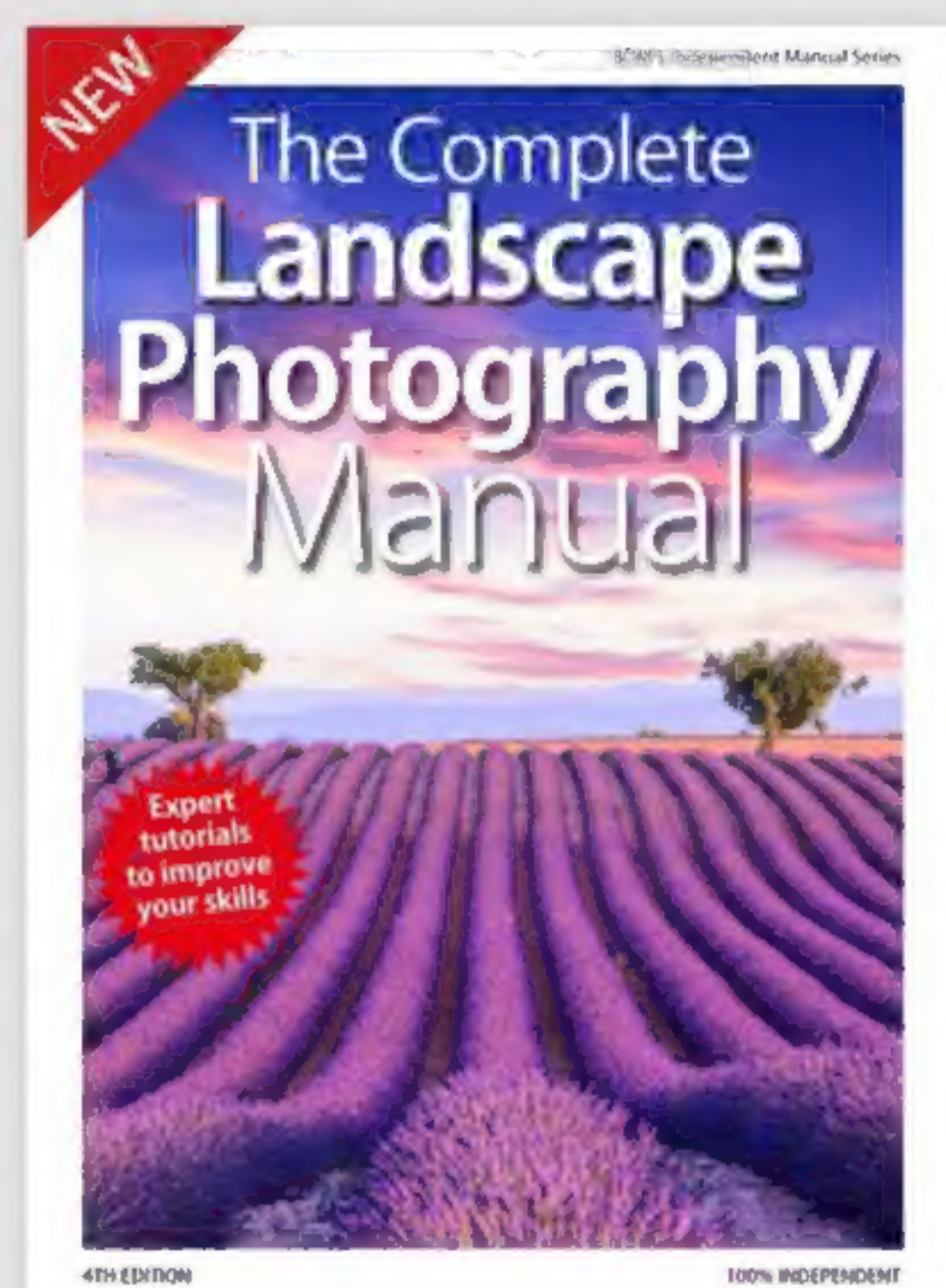
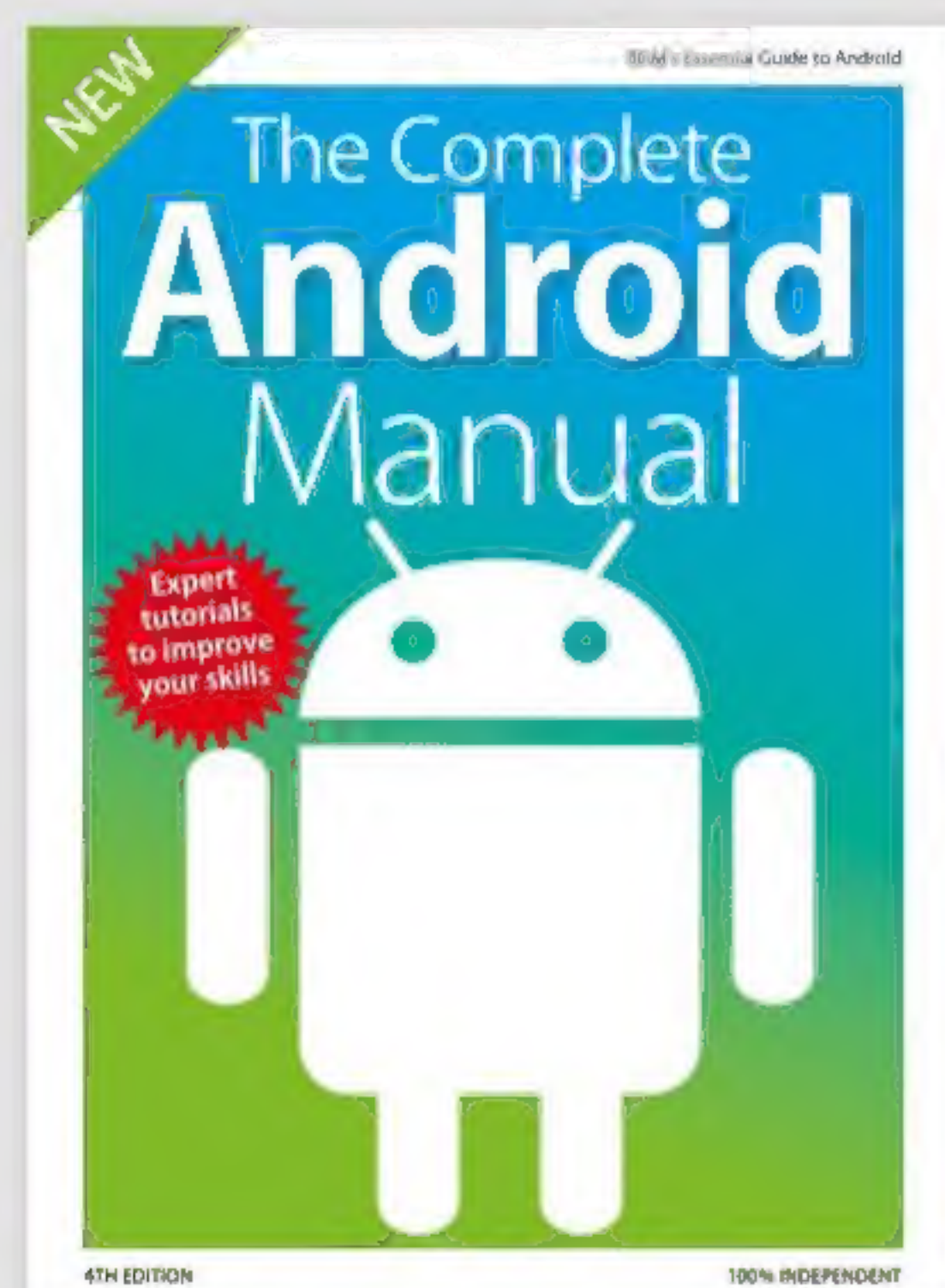
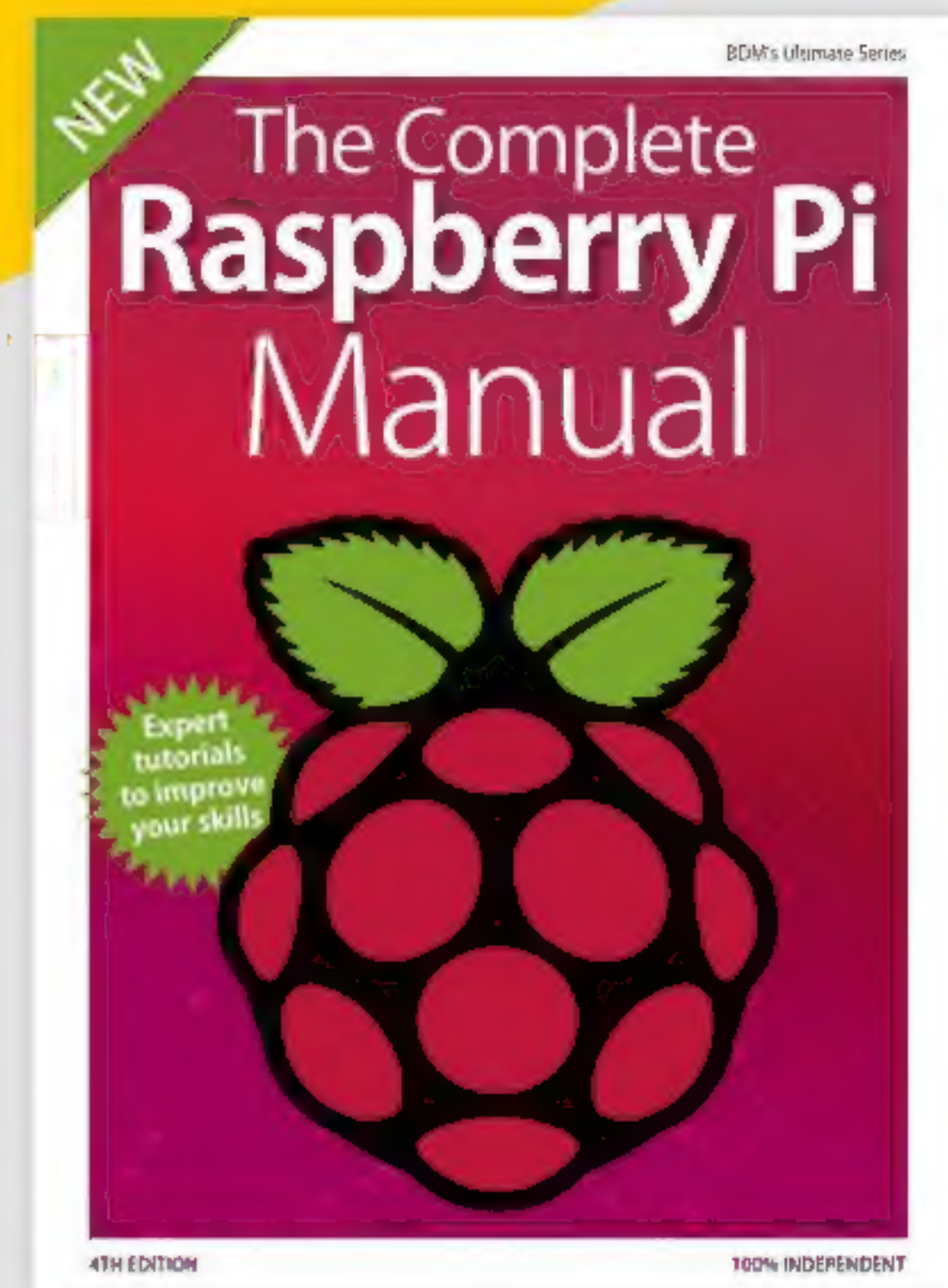
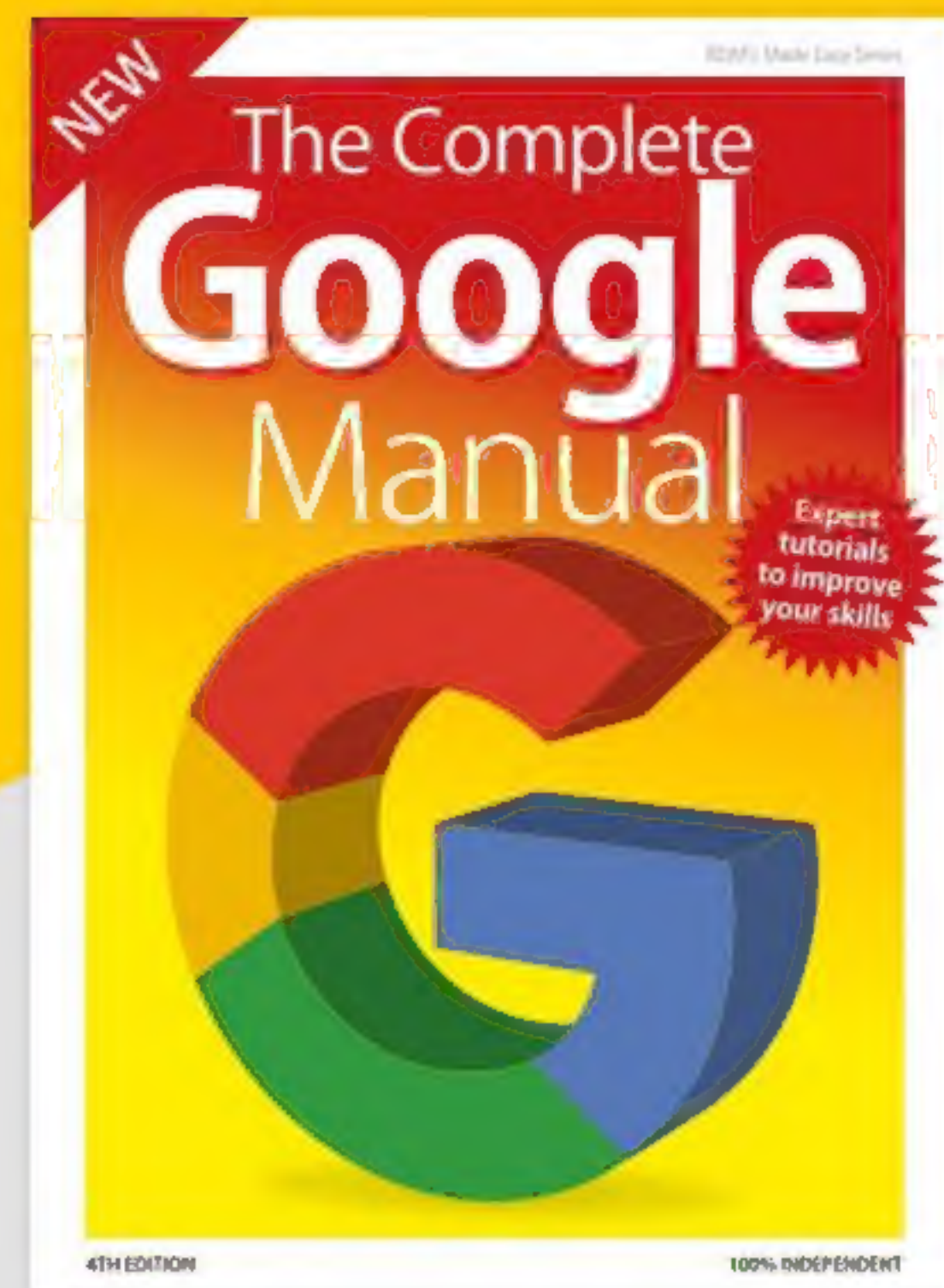
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